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February 7, 2012

Mr. Steven L. Renninger
On-Scene Coordinator
Emergency Response Branch
U.S. Environmental Protection Agency, Region V
26 West Martin Luther King Drive, Office G-41
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Subject: **Final Letter Report**
Behr VOC Plume Site – PRP Removal Action
Dayton, Montgomery County, Ohio
Technical Direction Document No.: S05-0003-0612-006
Document Control No.: 120-2A-AUAC
Contract No.: EP-S5-06-04

Dear Mr. Renninger:

The Weston Solutions, Inc. (WESTON®), Superfund Technical Assessment and Response Team (START) prepared this letter report in accordance with the requirements of Technical Direction Document (TDD) No. S05-0003-0612-006, which the U.S. Environmental Protection Agency (U.S. EPA) assigned to WESTON START. The scope of this TDD was to support and oversee a potentially responsible party (PRP) time-critical removal action involving a vapor intrusion investigation, the installation of sub-slab depressurization systems (SSDS), and the design and installation of a soil vapor extraction (SVE) system at the Behr Volatile Organic Compound (VOC) Plume Site in Dayton, Montgomery County, Ohio (the Site). Daimler Chrysler Corporation (Chrysler) is the PRP for the removal action. The PRP removal action involved (1) collecting sub-slab and indoor air samples from residential, commercial, and industrial properties and an elementary school and (2) installing SSDSs in the southern McCook Field Neighborhood of Dayton.

The geographical coordinates of the Site are 39° 46' 26.1294" North latitude and 84° 10' 53.061" West longitude (see **Figure 1** in **Attachment A**). **Figure 2** in **Attachment A** shows the Chrysler removal action area of investigation. To complete the TDD, WESTON START performed the following activities:

- Reviewed the "Phase I Work Plan for Indoor Air Sampling and Mitigation" (dated December 22, 2006, and revised on January 26, 2007) (see **Attachment B**)
- Oversaw Chrysler collecting baseline and proficiency sub-slab and indoor air samples from residential, commercial, and industrial properties and an elementary school
- Collected nine side-by-side residential indoor air samples to ensure quality control by the Chrysler environmental contractor

- Collected baseline sub-slab or indoor air or both sub-slab and indoor air samples from 31 residential properties, 2 commercial properties, and 2 elementary schools
- Oversaw the Chrysler environmental contractor install 56 SSDSs in residential and commercial properties and an elementary school during Phase I and II work activities
- Reviewed the Chrysler report entitled "Behr VOC Plume Report" (dated April 17, 2007) (see **Attachment C**)
- Reviewed the "Phase II Work Plan" (dated March 23, 2007; revised by Chrysler on October 26, 2007; and modified and approved by U.S. EPA on November 6, 2007) (see **Attachment D**)
- Participated in two public meetings and one media briefing
- Reviewed the "Phase II Work Plan Addendum – Soil Vapor Extraction System Design" (dated March 3, 2008) (see **Attachment E**)
- Provided project oversight details to the U.S. EPA for the preparation of three pollution reports (POLREP) (see **Attachment F**)
- Prepared photographic documentation of PRP time-critical removal activities and WESTON START sampling activities (see **Attachment G**)

WESTON START members John Sherrard, Randy Kirkland, Kara Cribbs, David Robinson, and Tim Smith conducted the PRP time-critical removal oversight activities listed above.

This letter report discusses the Site background, signed access agreements obtained before the vapor intrusion investigation, Chrysler vapor intrusion sampling activities, vapor intrusion screening levels, vapor intrusion sampling result categories, Chrysler SSDS installation, radius-of-influence testing, post-installation proficiency air sampling results, U.S. EPA independent air sampling, and SVE system installation, and provides a summary of the PRP removal action.

SITE BACKGROUND

The Behr Dayton Thermal Products Facility (Behr-Dayton facility) is located at 1600 Webster Street in Dayton, Montgomery County, Ohio (see **Figure 2** in **Attachment A**). The Behr-Dayton facility manufactures vehicle air-conditioning and engine-cooling systems. Chrysler owned and operated the Behr-Dayton facility from at least 1937 until April 2002.

Groundwater beneath the Behr-Dayton facility is contaminated with VOCs, including trichloroethylene (TCE). Groundwater in the area of the Behr-Dayton facility is located at approximately 20 feet below ground surface (bgs). Chrysler contracted an environmental consulting firm, Earth Tech, to design, install, and operate two on-site systems to remediate soil and groundwater contamination under the Behr-Dayton facility, with TCE as the main contaminant of concern. Earth Tech installed an SVE system on the Behr-Dayton facility property for soil remediation that began operating in October 2003. The system operated through December 2005. Earth Tech also installed a groundwater remediation system on the Behr-Dayton facility property that began operating in June 2004. Chrysler had the two systems installed voluntarily and without oversight by the Ohio Environmental Protection Agency (Ohio EPA).

TCE-contaminated groundwater has migrated south-southwest from the Behr-Dayton facility to residential, commercial, and industrial properties.

Since 2001, Earth Tech has conducted groundwater monitoring on a network of 75 on- and off-site groundwater monitoring wells. In 2003, the following monitoring wells were sampled and found to contain elevated TCE levels: MW010S (17,000 parts per billion [ppb]), MW028S (9,600 ppb), and MW029S (16,000 ppb). These monitoring wells are located along the southern perimeter of the Behr-Dayton facility (MW010S) or in the adjacent neighborhood (MW028S and MW029S).

On September 28, 2006, Earth Tech submitted quarterly groundwater sampling results to Ohio EPA. The report states that one shallow groundwater monitoring well, MW038S, which is located at the intersection of Daniel and Lamar Streets in the residential area south of the Behr-Dayton facility, contained a TCE concentration of 3,900 ppb.

On October 16, 2006, Ohio EPA installed seven soil gas probes along Daniel Street, Lamar Street, and Milburn Avenue to evaluate potential risk posed by vapor intrusion from the TCE groundwater plume. The soil gas probes were installed approximately 1 to 2 feet above the depth of groundwater, which was determined to be located at approximately 20 feet bgs. Once the soil gas probes were installed, an air sample was collected and analyzed for VOCs. Ohio EPA soil gas analytical results revealed TCE concentrations as high as 160,000 parts per billion by volume (ppbv). The highest soil gas sample result was from a soil gas probe installed on Lamar Street west of the intersection of Lamar Street and Milburn Avenue.

On November 6, 2006, Ohio EPA formally requested U.S. EPA to conduct a time-critical removal action to determine if vapor intrusion was occurring in residential properties south of the Behr-Dayton facility. Vapor intrusion is considered to occur when a chemical of concern can be traced from shallow groundwater (at less than 25 feet bgs) to soil gas, to sub-slab gas, and then into the indoor air at a property. When this occurs, the Ohio Department of Health (ODH) defines the vapor intrusion pathway as a "completed exposure pathway."

At the request of U.S. EPA, the ODH established the TCE screening levels summarized below for residential, commercial, and industrial properties.

- The residential sub-slab TCE screening level was established at 4.0 ppbv, and the residential indoor air TCE screening level was established at 0.4 ppbv.
- The commercial sub-slab TCE screening level was established at 17 ppbv, and the commercial indoor air TCE screening level was established at 1.7 ppbv.

- The industrial indoor air TCE screening level was established at 100 parts per million (ppm). ODH did not require sub-slab sample collection at industrial facilities. Therefore, an indoor air TCE screening level only was established.

In November 2006, U.S. EPA conducted a site assessment in the residential neighborhood immediately south of the Behr-Dayton facility. U.S. EPA tasked WESTON START to collect sub-slab vapor probe and indoor air samples from eight residences. All eight sub-slab vapor probe air samples contained TCE vapor levels exceeding the sub-slab screening level of 4 ppbv, with a maximum TCE concentration of 62,000 ppbv. Analytical results also indicated that all eight indoor air samples contained TCE vapor levels exceeding the residential indoor air TCE screening level of 0.4 ppbv, with a maximum TCE vapor level of 260 ppbv.

Based on analytical results and conditions during the 2006 site assessment, U.S. EPA determined that the Site met the criteria for a removal action as outlined in Title 40 of the *Code of Federal Regulations*, Part 300.415(b)(2). U.S. EPA determined that the chemicals detected at the Site posed an imminent health threat and presented a danger to individuals occupying residential structures at the Site.

On November 17, 2006, U.S. EPA held a meeting with representatives from WESTON START, Ohio EPA, ODH, Behr-Dayton facility, and Chrysler. U.S. EPA explained the vapor intrusion analytical results from the site assessment, the elevated TCE vapor levels in the indoor air of the eight residential homes, and the importance of immediately installing SSDSs in the residential homes with elevated indoor air TCE concentrations.

On November 21, 2006, a technical meeting was conducted between U.S. EPA, WESTON START, Ohio EPA, Chrysler, and Chrysler's environmental consultant, Earth Tech. Chrysler indicated that it would resample the residential homes that U.S. EPA had sampled during the November 2006 site assessment and would sample up to 21 residential homes immediately south of the Behr-Dayton facility. Chrysler also indicated that it planned to immediately install SSDSs in the eight residential homes sampled by U.S. EPA where indoor air TCE concentrations were as high as 260 ppbv.

In December 2006, Chrysler signed an Administrative Order on Consent (AOC) to conduct a PRP time-critical removal action at the Site. The removal action involved conducting a vapor intrusion investigation and installing SSDSs in residential, commercial, and industrial facilities where sub-slab and indoor air TCE concentrations (or indoor air TCE concentrations only) exceeded the ODH screening levels.

On December 12, 2006, Chrysler installed its first three SSDSs in residential homes located on Daniel and Leo Streets.

On January 19, 2007, U.S. EPA conditionally approved Chrysler's "Phase I Work Plan for Indoor Air Sampling and Mitigation." The Phase I work plan involved vapor intrusion sampling and, if necessary, SSDS mitigation at up to 21 residential properties south of the Behr-Dayton facility.

On January 26, 2007, Chrysler finalized and submitted the Phase I work plan (see **Attachment B**).

On February 8, 2007, U.S. EPA conducted a public meeting at Kiser Elementary School to update the community about the upcoming Chrysler-funded vapor intrusion investigation and sampling activities in the southern McCook Field Neighborhood. **Attachment H** provides a copy of U.S. EPA's PowerPoint presentation for the public meeting.

In March 2007, Chrysler submitted a draft Phase II work plan dated March 23, 2007. The Phase II work plan expands the area of the vapor intrusion investigation to the south and southwest.

In April 2007, Chrysler submitted the "Behr VOC Plume Report" dated April 17, 2007 (see **Attachment C**). The report, as explained by Chrysler, provides a comprehensive summary of data gathered by Chrysler to support actions required under the AOC related to the potential migration of vapor-phase TCE. The report outlines Chrysler's opinion that the AOC area of concern contains co-mingled plumes and delineates a boundary where Chrysler stated that it would conduct a vapor intrusion investigation as part of the Phase II work plan.

On April 10 and July 18, 2007, U.S. EPA collected sub-slab and indoor air samples from VanCleve at McGuffey Elementary School. TCE concentrations in the sub-slab samples were as high as 110 ppbv and in the indoor air samples as high as 4.3 ppbv.

In July 2007, Chrysler collected sub-slab and indoor air samples from VanCleve at McGuffey Elementary School. TCE concentrations in the sub-slab samples were as high as 7,660 ppbv and in the indoor air samples as high as 20.9 ppbv. The school subsequently was closed because the sub-slab and indoor TCE concentrations exceeded the residential sub-slab and indoor air TCE screening levels. Chrysler immediately began designing an SSDS for the school.

On August 2, 2007, U.S. EPA conducted a media briefing at Kiser Elementary School to update the media about the Chrysler-funded vapor intrusion investigation and sampling activities in the southern McCook Field Neighborhood and the sampling results from the vapor intrusion sampling at VanCleve at McGuffey Elementary School. **Attachment I** provides a copy of U.S. EPA's PowerPoint presentation for the media briefing.

On August 6, 2007, Chrysler completed installing the SSDS at VanCleve at McGuffey Elementary School.

In August 2007, U.S. EPA issued a letter requesting Chrysler conduct vapor intrusion sampling in an area of the southern McCook Field Neighborhood bordered to the north by Protzman Street, to the east by Kiser Street and to the south by State Highway 4. This area was selected for the reasons stated below.

- Groundwater in the area is located approximately 20 feet bgs, and groundwater samples collected by the Ohio EPA in this area contained TCE at concentrations exceeding 200 ppb, indicating the potential for vapor intrusion.

- U.S. EPA collected sub-slab and indoor air samples from six residential properties in this area. Sub-slab and indoor air TCE concentrations exceeded the sub-slab and indoor air TCE screening levels established by ODH.

In October 2007, Chrysler issued a letter to U.S. EPA formally stating that it did not intend to conduct vapor intrusion sampling in the area requested in August 2007. Chrysler claimed that the TCE plume beneath the southern McCook Field Neighborhood was a co-mingled plume containing TCE from other responsible parties.

On October 26, 2007, Chrysler submitted its revised Phase II Work Plan to U.S. EPA with an updated map showing the Phase II area of investigation. **Figure 2** in **Attachment A** provides a map showing Chrysler's revised area of investigation.

After a dispute resolution, on November 8, 2007, the U.S. EPA submitted a letter to Chrysler indicating that U.S. EPA would be initiating a fund-lead removal action in the southern McCook Field Neighborhood, including sampling and mitigation at residential properties only. No commercial or industrial properties would be sampled under U.S. EPA's fund-lead removal action. **Figure 3** in **Attachment A** shows the areas of investigation for the U.S. EPA removal action as well as the area where Chrysler would be conducting its removal action.

On November 13, 2007, U.S. EPA submitted a conditional approval letter to Chrysler for the Phase II work plan (modified and revised on November 6, 2007 by U.S. EPA). **Attachment D** provides the final version of the Phase II work plan.

On February 25, 2008, Chrysler submitted the "Phase II Work Plan Addendum – Soil Vapor Extraction System Design." The SVE system was planned for installation in the residential neighborhood directly south of the Behr-Dayton facility.

On March 4, 2008, U.S. EPA approved the modified "Phase II Work Plan Addendum – Soil Vapor Extraction System Design" (see **Attachment E**).

On April 24, 2008, Chrysler completed the installation of the SVE system in the neighborhood immediately south of the Behr-Dayton facility.

From April 2008 through July 2009, Chrysler worked under the U.S. EPA-approved Phase I and Phase II work plans and the addendum for the installation of the SVE system south of the Behr-Dayton facility.

As of June 17, 2009, Chrysler had completed vapor intrusion sampling at approximately 118 residential, commercial, and industrial properties. Fifty-seven properties met the criteria for requiring an SSDS. Chrysler had installed 56 of the 57 SSDSs.

In early July 2009, Chrysler declared bankruptcy, and on July 10, 2009, all work at the Site being conducted by Chrysler's environmental consultant, AECOM Technical Services, Inc. (AECOM), (formerly known as Earth Tech) was terminated.

SIGNED ACCESS AGREEMENTS

Before any sampling was conducted for Chrysler's vapor intrusion investigation, a signed access agreement was required from each property owner to grant Chrysler permission to access and sample each property. A copy of a blank access agreement is provided in Attachment K of the Phase I work plan (see **Attachment B**).

CHRYSLER VAPOR INTRUSION SAMPLING ACTIVITIES

During Phase I and Phase II activities, Chrysler collected sub-slab and indoor air samples or indoor air samples only from approximately 118 residential, commercial, and industrial properties and an elementary school to determine if vapors from the TCE-contaminated groundwater plume were migrating through soil and into structures at the properties, thereby posing a threat to human health.

The vapor probes for the sub-slab air samples were installed and the samples collected in accordance with the "Standard Operating Procedures for the Construction and Installation of Permanent Sub-Slab Soil Gas Wells, #2082" (SOP No. 2082), dated March 18, 2004, under the U.S. EPA Response Engineering and Analytical Contract (REAC). A copy of the SOP is located in Attachment I of the Phase I work plan (see **Attachment B**).

The sub-slab vapor probes were installed at properties having basements with concrete slab floors and properties without basements that had concrete slab foundations. If a basement had a dirt floor or dirt crawl space, an indoor air sample was collected in the basement or within the crawl space. If a basement had a concrete floor with a dirt crawl space, a sub-slab probe was installed in the concrete floor and the indoor air sample was collected from within the dirt crawl space.

All sub-slab and indoor air samples were collected using pre-cleaned, laboratory-supplied, 6-liter (L) SUMMA canisters. The SUMMA canisters were fitted with flow regulators to allow sample collection over a 24-hour period and were connected to stainless-steel sub-slab vapor probes with Teflon tubing. The indoor air samples were collected concurrently from each property at a height of 2 to 3 feet above the floor of the basement over a 24-hour period.

All sub-slab and indoor air samples were submitted under chain of custody for TCE analysis using U.S. EPA Method TO-15.

VAPOR INTRUSION SCREENING LEVELS

As discussed above, at the request of U.S. EPA, the ODH established the TCE screening levels summarized below for residential, commercial, and industrial properties.

- The residential sub-slab TCE screening level was established at 4.0 ppbv, and the residential indoor air TCE screening level was established at 0.4 ppbv.
- The commercial sub-slab TCE screening level was established at 17 ppbv, and the commercial indoor air TCE screening level was established at 1.7 ppbv.
- The industrial indoor air TCE screening level was established at 100 ppm. ODH did not require sub-slab sample collection at industrial facilities. Therefore, an indoor air TCE screening level only was established.

The screening levels were derived from the U.S. EPA draft guidance document entitled "OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils" dated November 2002 (EPA 530-D-02-004) and were based on target indoor air concentrations at the 10^{-4} risk level.

VAPOR INTRUSION SAMPLING RESULT CATEGORIES

The vapor intrusion sampling results were categorized as summarized below.

Category 1 – Indoor Air Exceedance or Sub-slab and Indoor Air Exceedance

In Category 1 samples, TCE was detected at concentrations exceeding the indoor air TCE screening level or both the indoor air TCE screening level and the sub-slab TCE screening level. Samples from 57 properties were Category 1 samples. These properties were eligible to receive an SSDS.

Category 2 – Sub-slab Exceedance without Indoor Air Exceedance

In Category 2 samples, TCE was detected at concentrations exceeding the sub-slab TCE screening level but not the indoor air TCE screening level. Samples from nine properties were Category 2 samples. The work plan states that the nine properties would be placed into a quarterly monitoring program under which they would be resampled (sub-slab and indoor air) every 3 months.

Category 3 – No Sub-slab or Indoor Air Exceedance

In Category 3 samples, TCE was not detected at concentrations exceeding either the sub-slab or the indoor air TCE screening levels. Samples from 52 properties were Category 3 samples. These properties were classified as "No Further Action," and no additional sampling was conducted.

Attachment J provides a summary of Chrysler's vapor intrusion air sampling results.

CHRYSLER SSDS INSTALLATION

As of June 17, 2009, Chrysler had installed 56 of the 57 SSDSs required. **Figure 4** in **Attachment A** is a map showing the locations where Chrysler installed the SSDSs. SSDSs were installed using different methods at properties with concrete basement floors or slab foundations and with dirt crawl spaces. These methods are summarized below. Figure 2 in the Phase I work plan (see **Attachment**

B) shows a typical SSDS layout. Some of the photographs in **Attachment G** taken by WESTON START show the SSDS features.

Properties with Concrete Basement Floors or Slab Foundations

Installation began by determining a sub-slab extraction point location in the basement. Each extraction point location was agreed to by the property owner. The extraction point was cored, and a 3-inch-diameter, Schedule 40, polyvinyl chloride (PVC) pipe was routed from the extraction point through the slab and outside the basement through a wall penetration. The PVC pipe then was connected to an extraction fan and the exhaust piping routed above the roof-line. Care was taken to exhaust the air above any nearby intake pipes or windows.

Any openings around the extraction point penetration or other cracks in the concrete foundation floor were sealed appropriately. The power supply to the fan then was locked to prevent accidental system shut-off. Each resident was supplied with a key to allow the power to be turned off for maintenance purposes.

A permanent vacuum gauge was installed on each system on the extraction side of the fan. The gauge consisted of a "U-tube" manometer and normally would read between 1 and 2.5 inches of water. The goal was to achieve vacuum under (across) the entire slab, with minimal vacuum draw from the extraction fan.

Properties with Dirt Crawl Spaces

For each property with a dirt crawl space, the Earth Tech installed a slotted PVC pipe on each dirt crawl space, covered the dirt crawl space with reinforced polymembrane, and then installed the SSDS as discussed above.

Chrysler supplied an operation and maintenance (O&M) manual to each owner of properties where an SSDS was installed. The O&M manual includes information such as copies of all paperwork signed, baseline and proficiency air sampling results (post -mitigation sampling), U.S. EPA website information, and system warranty information.

RADIUS-OF-INFLUENCE TESTING

After each SSDS was installed, the radius of influence was measured using a digital manometer to determine that a vacuum was being applied under (across) the entire foundation slab. The vacuum at the initial sub-slab vapor probe location was checked using the digital manometer. A second sub-slab probe was installed at the opposite side of the basement from where the extraction point was installed, and the vacuum was checked. If a vacuum reading was observed at both locations (at least 0.005 inch of water), there was a high probability that the vapor abatement system was working properly.

If a vacuum reading was not observed at a sub-slab vapor probe, an additional extraction point was installed on another section of the foundation and placed as far away as possible from the other extraction point(s). Once the additional extraction point was installed, the radius of influence was checked again.

POST-INSTALLATION PROFICIENCY AIR SAMPLING RESULTS

To check that each SSDS was operating effectively, the Phase I and Phase II work plans required Chrysler to collect indoor air and sub-slab air samples at 10, 30, 180, and 360 days after installation of the SSDS. Some properties were sampled at additional time periods, such as 60 and 90 days after installation of the SSDS, because the indoor air TCE levels at 30 days still exceeded the TCE screening level. The proficiency air samples document whether or not the SSDSs were effectively reducing indoor air TCE vapor levels to concentrations below the indoor air TCE screening level.

Attachment J provides the post-SSDS installation proficiency air sampling results for each property.

U.S. EPA INDEPENDENT AIR SAMPLING

This section discusses sampling activities that U.S. EPA tasked WESTON START to conduct, which included the following:

- side-by-side indoor air sampling during Phase I activities,
- post-SSDS installation proficiency indoor air sampling during Phase I activities,
- baseline sampling in the Phase I area of investigation,
- baseline sampling outside the Phase I area of investigation,
- vapor intrusion sampling at VanCleve at McGuffey Elementary School, and
- vapor intrusion sampling at Kiser Elementary School.

Attachment L presents the validated analytical results for all U.S. EPA (WESTON START) vapor intrusion air samples.

Baseline Side-By-Side Indoor Air Sampling During Phase I Activities

U.S. EPA tasked WESTON START to collect air samples throughout Phase I activities in order to obtain independent TCE analytical data for comparison against Chrysler's data. WESTON START collected baseline indoor air samples from four residential properties and five proficiency indoor air samples from properties where SSDSs were installed in the Phase I area of investigation. The indoor air samples were collected side-by-side with the baseline indoor air samples collected by Chrysler's environmental consultant, Earth Tech. **Figure 2** in **Attachment A** shows the Chrysler Phase I area of investigation. Baseline indoor air samples were collected from the following properties:

Non-Responsive

Table 1 in **Attachment K** presents a side-by-side comparison of U.S. EPA's sampling results with Chrysler's sampling results. Results of the comparison indicate that the two sets of indoor air sample results are consistent.

Post-SSDS Installation Proficiency Indoor Air Sampling during Phase I Activities

U.S. EPA tasked WESTON START to collect post-SSDS installation proficiency indoor air samples from five residential properties during the same sampling period that Earth Tech collected its proficiency indoor air samples to determine the effectiveness of the SSDSs. Post-SSDS installation proficiency indoor air samples were collected from the following properties:

Non-Responsive

Table 1 in **Attachment K** presents a side-by-side comparison of U.S. EPA's sampling results with Chrysler's sampling results. Results of the comparison indicate that the two sets of indoor air sample results are consistent.

Baseline Sampling within Phase I Area of Investigation

On October 2, 2008, Earth Tech sampled Non-Responsive, a residential property within the Phase I area of investigation. Earth Tech's analytical results showed a sub-slab TCE concentration exceeding 4.0 ppbv, but the indoor air sample showed a TCE concentration below 0.4 ppbv. To verify the sampling results, on October 20, 2008, U.S. EPA tasked WESTON START to collect a baseline sub-slab and a baseline indoor air sample from Non-Responsive. **Table 2** in **Attachment K** summarizes U.S. EPA's sampling results.

The TCE concentration in the sub-slab sample was below 4.0 ppbv, but the indoor air sample contained TCE at just above 0.4 ppbv. Chrysler used both sets of data to show that vapor intrusion was occurring and Chrysler eventually installed an SSDS at the property.

Baseline Sampling Outside Phase I Area of Investigation

U.S. EPA tasked WESTON START to collect sub-slab and indoor air samples from residential and commercial properties located outside of the Phase I area of investigation. U.S. EPA's goal was to determine if TCE vapors were present in the sub-slab area or indoor air at properties west, north, east and southeast of the Behr-Dayton facility and south and east of VanCleve at McGuffey Elementary School. Samples were collected from 32 properties. **Table 2** in **Attachment K** summarizes U.S. EPA's sampling results. **Figure 5** in **Attachment A** shows the sampling locations. Results are summarized below.

TCE concentrations in the sub-slab and indoor air samples did not exceed the TCE screening levels at the following properties:

- Two residential properties west of the Behr-Dayton facility [redacted]
- One commercial property north of the Behr-Dayton facility (2009 Stanley Avenue – Interstate Battery)
- Three residential properties located east of the Behr-Dayton facility ([redacted]

TCE concentrations in the sub-slab samples did not exceed the TCE screening level at the following 13 residential properties bordered by Kiser Street to the west, Leo Street to the north, Troy Street to the east, and Hart Street to the south:

[redacted]

TCE concentrations in the sub-slab samples did not exceed the TCE screening level at the following four residential properties east of VanCleve at McGuffey Elementary School:

- [redacted]
- [redacted]
- [redacted]
- [redacted]

TCE concentrations in the sub-slab samples did not exceed the TCE screening level at the following two residential properties located south of VanCleve at McGuffey Elementary School:

- Non-Responsive
- Non-Responsive

TCE concentrations in the sub-slab samples exceeded the TCE screening level at the following four residential properties located south of VanCleve at McGuffey Elementary School:

Non-Responsive

TCE concentrations in the indoor air samples exceeded the TCE screening level at the following two residential properties located south of VanCleve at McGuffey Elementary School:

Non-Responsive

The TCE concentration in the sub-slab sample exceeded the TCE screening level at 1440 Milburn Avenue (Clean City Janitors), a commercial property located immediately south of the Phase I area of investigation.

<u>Vapor Intrusion Sampling at VanCleve at McGuffey Elementary School</u>

In Spring 2007, U.S. EPA and ODH were concerned that the VanCleve at McGuffey Elementary School potentially was being impacted by vapor intrusion based on elevated TCE concentrations in shallow groundwater and the location of the TCE groundwater plume in the southern McCook Field neighborhood. U.S. EPA tasked WESTON START to collect vapor intrusion samples from the VanCleve at McGuffey Elementary School. **Table 3** in **Attachment K** summarizes the sampling results.

On March 19, 2007, WESTON START collected a baseline sub-slab air sample from the Boiler Room of the school. The sample contained TCE at 0.17 ppbv, which is below the sub-slab TCE screening level of 4.0 ppbv.

On April 10, 2007, WESTON START collected a sub-slab sample and an indoor air sample from the Boiler Room of the school. The sub-slab sample contained TCE at 110 ppbv, which exceeds the sub-slab screening level of 4.0 ppbv. The indoor air sampled contained TCE at 0.2 ppbv, which is below the indoor air TCE screening level of 0.4 ppbv.

On July 18 and 19, 2007, Earth Tech collected six indoor air samples and four sub-slab samples from the school. **Table 4** in **Attachment K** summarizes the sampling results. The sub-slab samples contained TCE at concentrations ranging from 993 to 7,660 ppbv. The indoor air samples contained TCE at concentrations ranging from 1.7 ppbv (Room 107) to 25.5 ppbv (basement north end). Once the results were obtained and shared with U.S. EPA, Chrysler committed to designing and installing an SSDS at the school.

For quality assurance, on July 18, 2007, U.S. EPA tasked WESTON START to collect side-by-side indoor air samples during the same sampling period as Earth Tech from Rooms 107 and 101. **Table 3** in **Attachment K** summarizes the sampling results. The indoor air sample from Room 107 contained TCE at 4.3 ppbv, and the sample from Room 101 contained TCE at 1.2 ppbv. Both indoor air sample TCE concentrations exceeded the indoor air screening level of 0.4 ppbv. The two U.S. EPA indoor air sample results are consistent with the indoor air results from Earth Tech.

On August 6, 2007, Chrysler completed installing a SSDS in the school. To evaluate the system after the first 10 days of operation, U.S. EPA tasked WESTON START to collect three independent indoor air samples on August 14, 2007. **Table 3** in **Attachment K** summarizes the sampling results. The indoor air samples were collected from the Boiler Room, Room 2, and Room 116. The three indoor air samples contained TCE at concentrations ranging from 1.4 to 7 ppbv, and all three results exceeded the indoor air screening level of 0.4 ppbv. The results proved that the SSDS at the school would require additional air sampling to determine if the SSDS was working.

U.S. EPA required Chrysler to conduct 15 rounds of post-mitigation sub-slab and indoor air sampling to monitor the effectiveness of the SSDS at the school. **Table 4** in **Attachment K** summarizes the sampling results. After numerous upgrades of the SSDS and re-sampling, Earth Tech eventually was able to show that the SSDS at the school was operating effectively during its January 13, 2009, sampling event. The sampling event documents that all nine indoor air samples collected from the school contained TCE at concentrations below the indoor air TCE screening level of 0.4 ppbv. No additional sampling was conducted by Earth Tech after January 13, 2009.

<u>Vapor Intrusion Sampling at Kiser Elementary School</u>

Because the Kiser Elementary School is located immediately east of the Behr-Dayton facility, U.S. EPA tasked WESTON START to collect vapor intrusion samples to determine if vapor intrusion was occurring at the school. **Table 5** in **Attachment K** summarizes the sampling results.

On March 20, 2007, U.S. EPA tasked WESTON START to collect a sub-slab sample from the Boiler Room in Kiser Elementary School. The sample contained TCE at 30 ppbv, which exceeds the sub-slab TCE screening level of 4.0 ppbv. Because the sub-slab TCE concentration exceeded the sub-slab screening level, on April 10, 2007, U.S. EPA tasked WESTON START to collect an indoor air sample from the Music Room. TCE was not detected in the sample.

Because the initial sub-slab sample contained TCE at a concentration exceeding the screening level but the indoor air sample contained TCE at a concentration below the screening level, U.S. EPA placed the school on a quarterly sampling program to further monitor and evaluate the potential for vapor intrusion.

As part of the quarterly monitoring program, on July 11, 2007, the second round of sub-slab and indoor air sampling was conducted. The sub-slab sample and the indoor air sample both were collected from the school's Boiler Room. The samples contained TCE at concentrations below the sub-slab and indoor air screening levels.

As part of the quarterly monitoring program, on December 27, 2007, the third round of sub-slab and indoor air sampling was conducted. The sub-slab sample was collected from the school's Boiler Room, and the indoor air sample was collected from the Music Room. The samples contained TCE at concentrations below the sub-slab and indoor air screening levels.

As part of the quarterly monitoring program, on March 26, 2008, the fourth round of sub-slab and indoor air sampling was conducted. The sub-slab sample was collected from the school's Boiler Room, and the indoor air sample was collected from the Music Room. The samples contained TCE at concentrations below the sub-slab and indoor air screening levels.

On December 22, 2008, U.S. EPA tasked WESTON START to collect another round of sub-slab and indoor air sampling at the school. The sub-slab sample was collected from the maintenance storage room, and the indoor air sample was collected from the control center prep room of the Challenger Center. The samples contained TCE at concentrations below the sub-slab and indoor air screening levels.

ODH concluded that based on the TCE sampling results, vapor intrusion was not occurring at the school.

SVE SYSTEM INSTALLATION

On March 3, 2008, Chrysler submitted an addendum to the EPA-approved Phase II work plan (see **Attachment E**) to install a SVE system in the neighborhood south of the Behr-Dayton facility. The area proposed for the SVE system was the residential and commercial area bounded by Leo Street to the north, Milburn Avenue to the east, Daniel Street to the west, and Lamar Street to the south.

The SVE system was installed to supplement the SSDSs inside the properties located within the boundaries stated above because after 1 year of operation, the SSDSs at the properties were not reducing indoor air TCE concentrations to below the TCE indoor air screening level.

The strategy for the SVE system was to remove TCE vapors from potential off-site contaminant source areas and reduce soil gas concentrations at the properties in the SVE system area. The SVE system was designed to focus on potential vadose zone soil contamination identified during soil gas sampling activities. The SVE system design consisted of a series of 11 vertical vapor extraction well points installed throughout the contaminant source area, SVE distribution piping, a treatment shed housing the equipment, and off-gas treatment. Extracted vapors were piped from the extraction wells to the treatment shed through subsurface PVC piping. Based on the anticipated contaminant removal rates and airflow rates, off-gas treatment was performed. The off-gas treatment technology consisted of two granular activated carbon (GAC) vessels.

On April 23, 2008, Chrysler completed installing the SVE system. The as-built drawing of the SVE system is presented in Figure 1 in **Attachment E**.

As part of the U.S. EPA-approved SVE system addendum to the Phase II work plan, Chrysler was required to collect a grab air sample from each of the following three locations: (1) before the GAC vessels (influent), (2) between the two GAC vessels, and (3) after the two GAC vessels (effluent).

From April 23 through December 9, 2008, Chrysler collected 23 sets of air samples. **Table 6** in **Attachment K** summarizes the sampling results. The “effluent” TCE concentrations were consistently below the Ohio EPA *de minimis* thresholds. The highest TCE concentration in the “effluent” was 4,390 ppbv.

U.S. EPA tasked WESTON START to collect independent air samples at the same three sample locations where Chrysler was collecting its air samples. The grab air samples were collected on October 14 and December 9, 2008. **Table 6** in **Attachment K** summarizes the sampling results. A separate 6-L SUMMA canister was used to collect each grab air sample. The air samples were sent to a commercial laboratory for analysis for TCE using Method TO-15.

Attachment L presents the validated analytical results for all WESTON START-collected vapor intrusion air samples and the SVE system performance air samples.

On May 14, 2009, Chrysler removed the two GAC vessels from the SVE system because the “effluent” TCE concentrations consistently were below the Ohio EPA *de minimis* thresholds.

SUMMARY

Vapor intrusion is considered to occur when a chemical of concern can be traced from shallow groundwater (at less than 25 feet bgs) to soil gas, to sub-slab gas, and then into indoor air at a property. When this occurs, the ODH defines the vapor intrusion pathway as a “completed exposure pathway.”

From December 2006 through July 2009, Chrysler sampled approximately 118 residential, commercial, and industrial properties, and an elementary school in the southern McCook Field Neighborhood to determine if vapors from TCE-contaminated groundwater were migrating through soil and into the properties, posing a threat to human health. A total of 57 locations showed sub-slab TCE levels exceeding the sub-slab screening levels (4.0 ppbv for residential properties and 17 ppbv for commercial properties) and indoor air TCE levels exceeding the TCE indoor air screening levels (0.4 ppbv for residential properties and 1.7 ppbv for commercial properties). Of these 57 properties, Chrysler installed SSDSs and performed performance air sampling at 56 of them.

A total of nine properties showed indoor air TCE concentrations less than the indoor air screening level but sub-slab TCE levels exceeding the sub-slab screening level. Chrysler conducted quarterly sub-slab and indoor air sampling at these nine properties.

A total of 52 properties required "No Further Action" because TCE sampling results were below the sub-slab or indoor air screening levels.

In April 2008, Chrysler completed installation of an SVE system in the neighborhood south of the Behr-Dayton facility. The SVE system affected residential and commercial properties in the area bounded by Leo Street to the north, Milburn Avenue to the east, Daniel Street to the west and Lamar Street to the south.

In early July 2009, Chrysler declared bankruptcy, and on July 10, 2009, all work at the Site being conducted by Chrysler's environmental consultant was terminated. The three POLREPs in **Attachment F** summarize the PRP removal activities. The final POLREP was finalized by U.S. EPA; posted on the http://epaosc.org/ website; and distributed to federal, state, and local representatives on August 26, 2009.

This letter report serves as the final deliverable for this TDD. WESTON START anticipates no further activities under this TDD. If you have any questions or comments about the report or need additional copies, please contact me at (513) 703-3092.

WESTON SOLUTIONS, INC.
Sincerely,

John Sherrard
WESTON START Project Leader

Frank Beodray
WESTON START Project Manager

Attachments:
A – Figures
B – Phase I Work Plan for Indoor Air Sampling and Mitigation
C – Behr VOC Plume Report
D – Phase II Work Plan
E – Phase II Work Plan Addendum – Soil Vapor Extraction System Design
F – POLREPs
G – Photographic Documentation
H – U.S. EPA PowerPoint Presentation from February 8, 2007, Public Meeting
I – U.S. EPA PowerPoint Presentation from August 2, 2007, Media Briefing

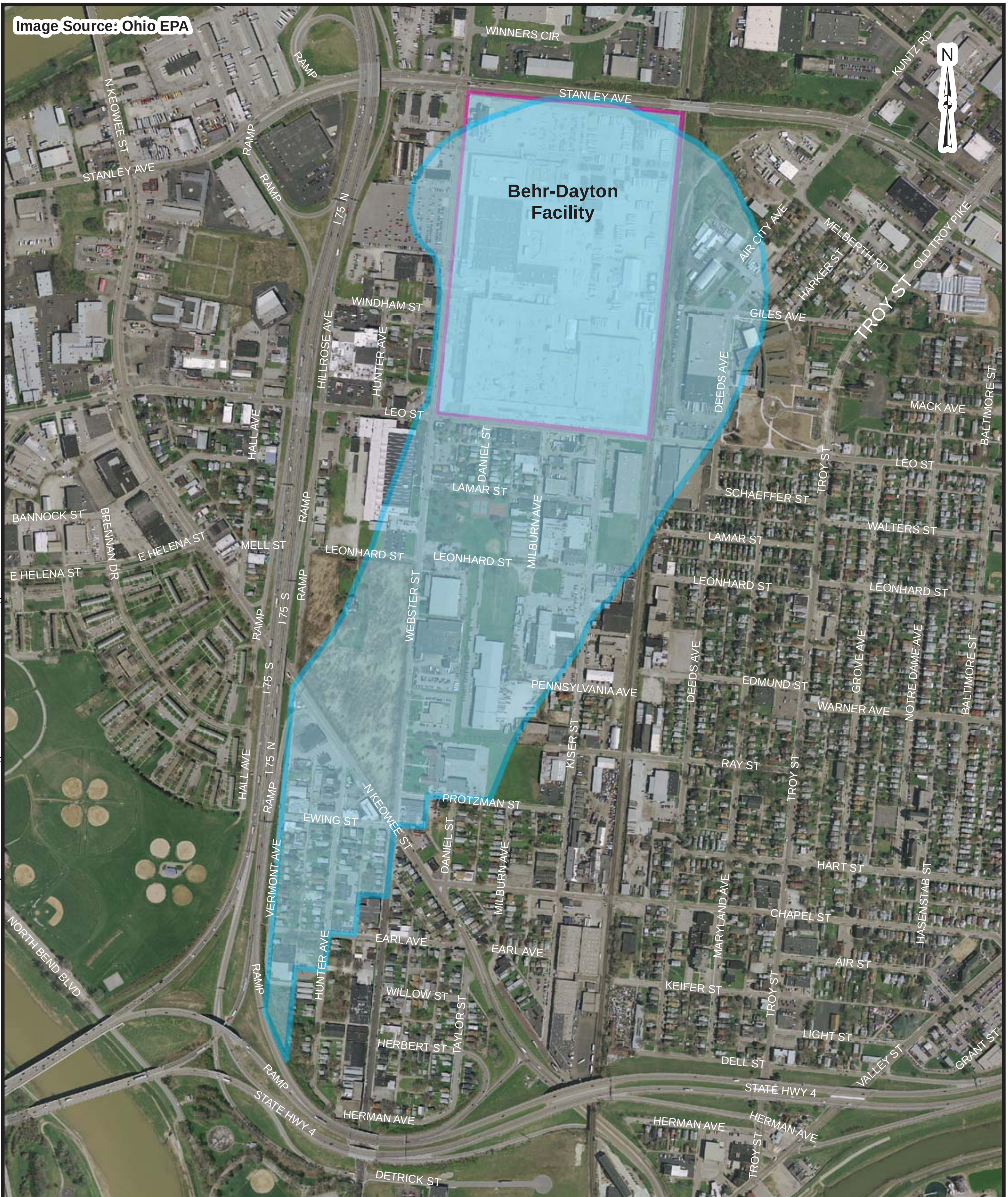
J – Chrysler Phase I and Phase II Vapor Intrusion Sampling Results
K – Tables
L – WESTON START Validated Analytical Results

cc: WESTON START DCN File

ATTACHMENT A
FIGURES

N 0 2 Miles	Prepared for: **U.S. EPA REGION V** Contract No.: EP-S5-06-04 TDD: S05-0003-0612-006 DCN: 120-2A-AUAC	Prepared By: **WESTON SOLUTIONS, INC** 4710-A Interstate Drive Cincinnati, Ohio 45246	**Figure 1** Site Location Map Behr VOC Plume Site – PRP Removal Action Dayton, Montgomery County, Ohio

FILE: C:\START Project Files\Behr VOC Plume\Behr_VOC_GIS_Files\Letter Report\PRP OS\mxd\Figure 1 Site Location Map.mxd 4:13:41 PM 1/23/2012 kirklanr



FILE: C:\START Project Files\Behr VOC Plume\Behr_VOC_GIS_Files\Letter Report\PRP OS\mxd\Figure 2 PRP Areas of Investigation.mxd 4:21:29 PM 1/23/2012 kirklanr

Legend

Chrysler Area of Investigation

0 800 Feet

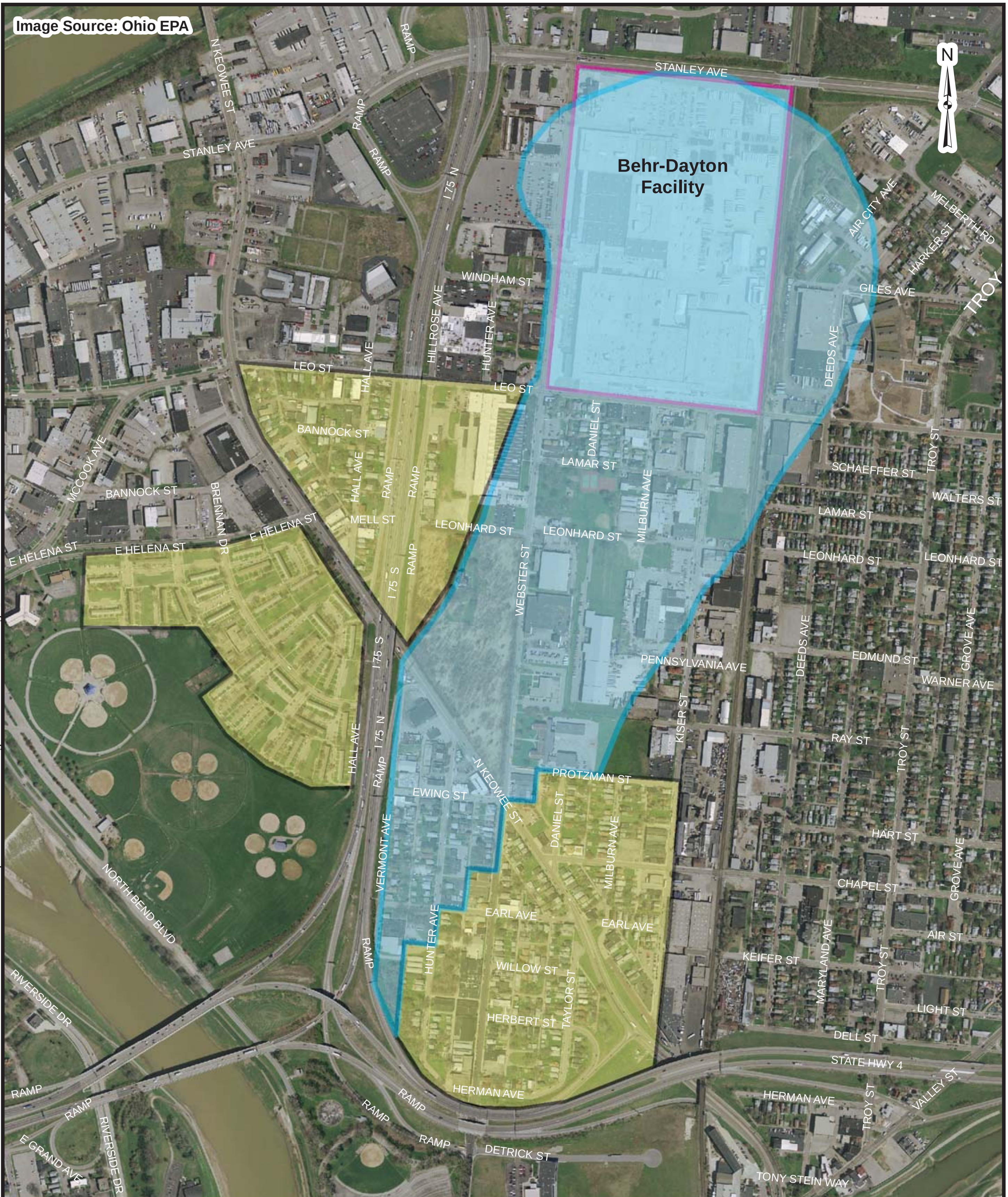
Prepared for:
U.S. EPA REGION V

Contract No.: EP-S5-06-04
TDD: S05-0003-0612-006
DCN: 120-2A-AUAC

Prepared By:
WESTON SOLUTIONS, INC

4710-A Interstate Drive
Cincinnati, Ohio 45246

Figure 2
Chrysler Area of Investigation
Behr VOC Plume Site – PRP
Removal Action
Dayton, Montgomery County, Ohio



FILE: C:\START Project Files\Behr VOC Plume\Behr_VOC_GIS_Files\Letter Report\PRP OS\mxd\Figure 3 Areas of Investigation.mxd 3:23:14 PM 2/6/2012 kirklanr

Legend

U.S. EPA Areas of Investigation

Chrysler Area of Investigation

0 800 Feet

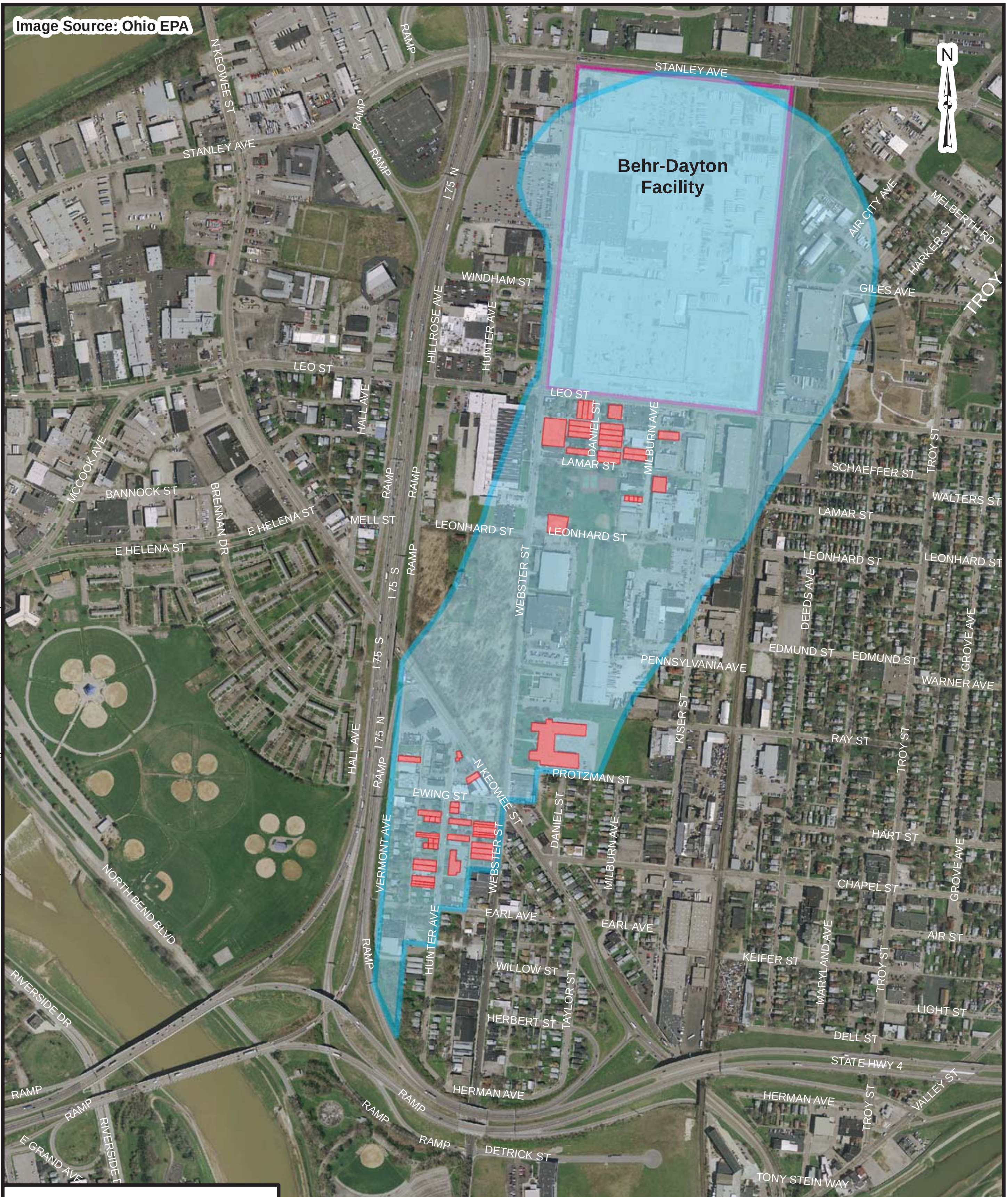
Prepared for:
U.S. EPA REGION V

Contract No.: EP-S5-06-04
TDD: S05-0003-0612-006
DCN: 120-2A-AUAC

Prepared By:
WESTON SOLUTIONS, INC

4710-A Interstate Drive
Cincinnati, Ohio 45246

Figure 3
U.S. EPA and Chrysler Area of Investigation Map
Behr VOC Plume Site - PRP Removal Action
Dayton, Montgomery County, Ohio



FILE: C:\START Project Files\Behr VOC Plume\Behr_VOC_GIS_Files\Letter Report\PRP OS\mxd\Figure 4 SSDS Location Map.mxd 4:45:29 PM 1/23/2012 kirklanr

Legend

Sub-Slab Depressurization System Location

Chrysler Area of Investigation

0 800 Feet

Prepared for:
U.S. EPA REGION V

Contract No.: EP-S5-06-04
TDD: S05-0003-0612-006
DCN: 120-2A-AUAC

Prepared By:
WESTON SOLUTIONS, INC

4710-A Interstate Drive
Cincinnati, Ohio 45246

Figure 4
Sub-Slab Depressurization System Location Map
Behr VOC Plume Site – PRP Removal Action
Dayton, Montgomery County, Ohio

Legend

Chrysler Area of Investigation

Below Sub-slab or Indoor Air Screening Level

Exceeded Sub-slab or Indoor Air Screening Level

0 800

Feet

Prepared for:
U.S. EPA REGION V

Contract No.: EP-S5-06-04
TDD: S05-0003-0612-006
DCN: 120-2A-AUAC

Prepared By:
WESTON SOLUTIONS, INC

4710-A Interstate Drive
Cincinnati, Ohio 45246

Figure 5
WESTON START Sampling Location Map
Behr VOC Plume Site – PRP Removal Action
Dayton, Montgomery County, Ohio

FILE: C:\START Project Files\Behr VOC Plume\Behr_VOC_GIS_Files\Letter Report\PRP OS\mxd\Figure 5 START Sampling Location Map.mxd 3:43:48 PM 2/7/2012 kirklanr

ATTACHMENT B
PHASE I WORK PLAN FOR INDOOR AIR SAMPLING AND MITIGATION

PHASE I WORK PLAN FOR
INDOOR AIR SAMPLING AND MITIGATION
BEHR VOC PLUME SITE
DAYTON, OHIO

Prepared by:

DaimlerChrysler Corporation
800 Chrysler Drive
Auburn Hills, MI 48326

Prepared For:

U.S. EPA Region 5
26 West Martin Luther King Drive
Cincinnati, OH 45268

December 22, 2006
Revised: January 26, 2007

TABLE OF CONTENTS

SECTION NO.	TITLE	PAGE NO.

TABLES

FIGURES

ATTACHMENTS

1. BACKGROUND

DaimlerChrysler Corporation (DCC) has prepared this Phase I Work Plan for Indoor Air Sampling and Mitigation to address chlorinated VOCs migrating into the basements of 8 residential properties based on testing conducted by U.S. EPA, and to conduct a vapor intrusion study at select residential properties south of the Behr Dayton Thermal Products Facility located at 1600 Webster Street in Dayton, Ohio (Behr-Dayton facility). This work is being performed pursuant to an Administrative Order by Consent (AOC) dated December 2006, between U.S. EPA and the DaimlerChrysler Corporation. This work plan addresses residential properties bounded by the following geographic area: Leo Street to the north, Lamar Street to the south, Webster Street to the west, and Milburn Avenue to the east. The investigation and response activities are related to a trichloroethylene (TCE) contaminated groundwater plume which has migrated south-southwest of the Behr facility and beneath the residential properties bounded by the streets mentioned above. Groundwater in this area is located approximately 20 feet below ground surface (bgs).

Behr Dayton Thermal Systems LLC is a Delaware limited liability company which currently owns and operates the Behr Dayton facility. Behr Dayton Thermal Systems LLC manufactures vehicle air conditioning and engine cooling systems at the facility.

DaimlerChrysler Corporation is a Delaware corporation that owned and operated the Behr Dayton facility from at least 1937 through April of 2002. DaimlerChrysler Corporation manufactured air conditioning equipment at the Behr Dayton facility. During DaimlerChrysler Corporation's ownership of the Behr Dayton facility, hazardous substances, including trichloroethene (TCE), were released at and from the Behr Dayton facility.

Earth Tech has conducted quarterly monitoring on a network of 75 on-site and off-site groundwater monitoring wells since 2001. In 2003, the following monitoring wells were sampled and contained elevated levels of TCE: MW010s (17,000 parts per billion (ppb)), MW028s (9,600 ppb), and MW029s (16,000 ppb). These monitoring wells are located along the southern perimeter of the Behr Dayton facility (MW010s) or in the adjacent neighborhood (MW028s and MW029s). On September 28, 2006, Earth Tech submitted the most recent quarterly groundwater sampling results to Ohio EPA. In the report, Earth Tech stated that one shallow groundwater monitoring well, MW038s, which is located at the intersection of Daniel Street and Lamar Street (residential area south of the Behr Dayton facility), contained a TCE concentration of 3,900 ppb.

DaimlerChrysler Corporation contracted Earth Tech to design, install, and operate two systems for the remediation of soil and groundwater contamination under the Behr Dayton facility. Earth Tech installed a soil vapor extraction (SVE) system on the site for soil remediation and began operation in October 2003. The system was operated through December 2005. Based on extracted air concentrations, the SVE system removed a total of 900 pounds of VOCs.

Earth Tech installed a groundwater remediation system on the site and began operation in June 2004. Through December 2005, the groundwater system had removed a total of 1031 pounds of VOCs, and dechlorinated 325 pounds of VOCs.

On October 16, 2006, Ohio EPA installed a total of seven soil gas probes along Daniel Street, Lamar Street and Milburn Avenue to evaluate potential risk posed by vapor intrusion from a volatile organic compound (VOC) groundwater plume. The depth of the soil gas probes were approximately one to two feet above the depth of groundwater (20 feet bgs). Once the soil probes were installed, an air sample was collected and analyzed for VOCs using EPA Method TO-14 modified.

Ohio EPA soil gas analytical results detected TCE concentrations at the following levels:

Sample ID	SG-1	SG-2	SG-3	SG-4	SG-5	SG-6	SG-7
TCE (ppb)	120,000	70,000	160,000	140,000	13,000	16,000	12,000

At the request of Ohio EPA, the U.S. EPA conducted a simultaneous vapor intrusion investigation. In October and November 2006, the U.S. EPA collected sub-slab air samples from eight residences located south of the Behr-Dayton facility along Milburn Avenue, Daniel Street and Leo Street. TCE concentrations were detected at the following levels :

Sample ID	EPA-01-SS	EPA-01-SS2	EPA-02-SS	EPA-03-SS	EPA-04-SS	EPA-05-SS	EPA-06-SS	EPA-07-SS	EPA-08-SS
TCE (ppb)	14,000	980	18,000	16,000	260	62,000	3,700	49	62,000

The results of the sub-slab testing indicated that eight samples exceed the ATSDR residential TCE sub-slab screening level of 4 ppbv and four samples exceed the ATSDR residential TCE sub-slab action level of 1,000 ppbv. Table 1 presents the Phase I Action Levels for the site.

Table 1 – Phase I Action Levels – Behr VOC Plume Site

Chemical	**Indoor Residential Action Level**[1]	**Sub-Slab Residential Action Level**	**Indoor Residential Screening Level**[2]	**Sub-Slab Residential Screening Level**
Trichloroethylene	100	1,000	0.4	4.0

[1] = ATSDR Intermediate Environmental Media Evaluation Guide (EMEG) for air

[2] = U.S. EPA **Draft** Vapor Intrusion Guidance document (2002) [Target Indoor air concentration at the 10^{-4} Risk Level]

Based on ATSDR and Ohio Department of Health (ODH) recommendations, the U.S. EPA followed sub-slab air sampling with indoor air sampling at eight locations in November 2006. TCE concentrations were detected at the following levels:

Sample ID	EPA-01-IA	EPA-02-IA	EPA-03-IA	EPA-04-IA	EPA-05-IA	EPA-06-IA	EPA-07-IA	EPA-08-IA
TCE (ppb)	1.2	180	130	13	260	7.5	0.4	49

The results of the indoor air sampling indicate that seven samples exceed the ATSDR residential TCE indoor air screening level of 0.4 ppbv and three samples exceed the ATSDR residential TCE indoor air immediate action level of 100 ppbv.

Under the AOC, DaimlerChrysler Corporation has agreed to perform the following activities under this Work Plan:

a) Develop and implement a Site Health and Safety Plan, including an Emergency Contingency Plan.
b) Conduct subsurface gas extent of contamination sampling at the Site utilizing groundwater, soil gas, sub-slab, and/or indoor air sampling techniques.
c) If the applicable Indoor Air Screening Level for TCE is exceeded, install interior TCE vapor abatement systems in structures impacted by TCE subsurface migration.

Abatement systems may include installation of a sub-slab vapor removal system or crawl space vapor removal system, sealing cracks in walls and floor of the basement, and/or sealing or fixing drains that could be a pathway.

d) Develop and implement a vapor abatement system performance sampling plan to confirm that applicable indoor air screening levels are achieved for TCE following installation of the TCE vapor abatement systems. Work will not be completed at any structure until quarterly monitoring (4 continuous quarters) for sub-slab and indoor air is documented less than the applicable screening levels in Table 1, following the termination of the TCE vapor abatement system operation (as directed by the EPA OSC).

For further information, a copy of the Administrative Order has been included in Attachment A.

Based on the Ohio EPA soil gas probe and U.S. EPA sub-slab air sample and indoor air sample data, this Work Plan has been prepared to:

a) collect additional sub-slab air samples and indoor air samples from the eight residences referenced in the preceding paragraphs (See Figure 1);
b) install sub-slab depressurization systems (SSDSs) to mitigate vapor intrusion at these eight properties;
c) collect sub-slab air samples and indoor air samples from up to thirteen additional residences in the area (See Figure 1); and
d) review the data collected from those additional residences and install additional SSDSs if indoor air results exceed appropriate TCE screening levels. In the event that sub-slab air sample results exceed the TCE screening level and indoor air results are less than the TCE residential screening level, a monitoring plan will be developed for indoor air.

2. SITE MOBILIZATION

2.1 HEALTH AND SAFETY PLAN

A Health and Safety Plan (HASP) has been established for this site. The HASP provides specific guidelines and establishes procedures for the protection of personnel during the investigation and system installation activities planned at the residential properties. The HASP is based upon existing data. HASP procedures will be updated if additional information is discovered which requires alteration of the plan. The HASP is included as Attachment B.

2.1.1 Emergency Contingency Plan

An **Emergency Contingency Plan** (ECP) has been established for this site. The ECP provides specific guidelines and establishes procedures for the protection of personnel in the event of an emergency. The ECP is included as Section 9.0 of the HASP. As part of the ECP process, a meeting will be held with local fire department and EMS personnel no more than 10 days after approval of this Work Plan.

3. QUALITY ASSURANCE PROJECT PLAN

A Quality Assurance Project Plan (QAPP) has been prepared to ensure data collected during the investigation phase is reliable. A copy of the QAPP is included as Attachment C.

4. SAMPLING PLAN

This work plan addresses indoor air issues in select residential properties located in Dayton, Ohio. The residential properties are bounded by the following geographic area: Leo Street to the north, Lamar Street to the south, Webster Street to the west, and Milburn Avenue to the east. Figure 1 outlines the locations and addresses of the properties of concern.

4.1 SAMPLING LOCATIONS

4.1.1 Previous Sampling Locations

Based on previous indoor air investigations by the U.S. EPA, seven residential properties with basements have been identified to exceed the ATSDR screening concentration for TCE of 0.4 ppbv, and one residential property has been identified at 0.4 ppbv. The addresses of these properties are as follows:

Non-Responsive
[redacted]

The U.S. EPA has requested that SSDSs be installed at these properties. If access is granted, installation of the SSDSs will occur as outlined in Section 5: System Installation. Prior to the installation of the systems, indoor air and sub-slab air samples will be collected independent of the previous U.S. EPA data.

4.1.2 Additional Sampling Locations

In addition to the residences above, access will be requested and if granted, indoor air and subsurface slab air samples will be collected from the remaining thirteen residential properties in the area. An indoor air screening level for TCE of 0.4 ppbv will be used to determine if an SSDS will be installed at these remaining thirteen residential properties. The addresses of the additional residential properties to be sampled are as follows:

Non-Responsive

[redacted]

All indoor air and subsurface slab air samples will be collected according to the protocol outlined in the following sections.

4.2 Access Requests

To ensure "best efforts" are made to gain access to the residential properties noted above, the following steps will be taken to request access:

1. Mailing – Within 5 days of notification by OSC that access to a property is necessary, a mailing will be delivered to each residence outlining the issues noted in the neighborhood and requesting a meeting to discuss the work that needs to be completed. The mailing will include contact information and a brief discussion of sampling activities to be conducted.
2. Visit – Within 10 days of the mailing, if there is no response to the mailing or if access is denied, the Montgomery County Health Department and/or DCC personnel will attempt to contact the residents and/or property owner in person.
3. Certified Letter – Within 10 days of the site visit, if attempts to contact the resident in person are unsuccessful or if access is denied, a certified letter will be mailed to the resident outlining the work to be completed.

4. Certified Letter #2 – If there is no response to the first certified letter or if access is denied within 10 days of receipt, a second certified letter will be mailed to the resident further encouraging that access be granted.
5. Notify U.S. EPA – In the event there is no response using the 4 steps above, or if access is denied, the U.S. EPA will be notified within 10 days that “best efforts” to gain access to the residential home have been unsuccessful.

All contact with the residents will be documented and logged. A resident contact list similar to the example included as Attachment D will be used to log contact with the residents. In the event that an owner denies access, an attempt will be made by DaimlerChrysler Corporation to obtain a written signature on the access agreement noting that the owner is denying access.

4.3 Sampling Strategy

One indoor air sample and one subsurface slab air sample will be collected from each of the residential properties listed in Section 4.1 where access has been granted, for a total of up to twenty-one indoor air samples and twenty-one subsurface slab air samples. The samples will be analyzed for chlorinated volatile organic compounds utilizing U.S. EPA Method TO-15. In the eight U.S. EPA identified residences, these samples will be used as baseline data prior to installing an SSDS. In the remaining residences, these samples will be used to determine whether an SSDS will be installed. EPA may collect independent sub-slab or indoor air samples during Phase 1. During this Phase 1 work, EPA will be updated concerning access, sample plans, and SSDS installations during the weekly conference calls or meetings. The residential contact list may provide a useful format. The sampling procedure and methodology are detailed in the following sections.

4.3.1 Indoor Air Sampling

The results from the samples collected from the residences will be reviewed, and an SSDS will be installed if indoor air results exceed the indoor air residential TCE screening level of 0.4 ppb. In the event that sub slab air sample results exceed the TCE screening level of 4 ppb, and indoor air results are less than the TCE residential screening level of 0.4 ppb, a monitoring plan will be submitted for EPA approval within fourteen calendar days of receiving the analytical results. The monitoring plan will consist of re-sampling of the sub slab and indoor air within that respective residence for 4 consecutive quarters following the initial sampling. The monitoring plan will be complete when 4 continuous quarters of indoor air results are less than the indoor air TCE residential screening level.

4.4 SAMPLING PROTOCOL

4.4.1 Sample Types

Sub-slab Air Samples

One sub-slab air sample will be collected from each residential property. In residential homes where U.S. EPA collected sub-slab air samples, an effort will be made to place the location of the sub-slab air samples at a point different than where U.S. EPA collected its sub-slab air sample in October or November 2006.

Indoor Air Samples

One indoor air sample will be collected from each residential property.

Blank Sample

One blank canister will be submitted to the laboratory as a trip blank for this evaluation. Canisters will be transported from the laboratory to the field and returned to the laboratory with other analytical samples.

Ambient Air Sample

One ambient air sample will be collected on each day that indoor air sampling is conducted. The location of the ambient air sample will be outdoors, upwind of the residential area being sampled.

Co-located Sample

One co-located sample will be collected from an indoor air sample location. The sample ports will be placed side by side. The co-located sample will be collected based on results from the U.S. EPA sampling event and coordination with the laboratory.

4.4.2 Information Acquisition

Various types of information will be obtained and recorded for the purposes of this evaluation. Data/information forms to be used are listed below.

- Canister Data Form: Used to record data on the condition of the canisters, sampling times, vacuum, etc. (Attachment E).

- Household Information Form: Used to record site specific information about household features that may help in the interpretation of the analytical data (Attachment F), including photographic documentation.
- Resident Questionnaire: Used to record information that may provide insight into sources of chemicals within the house that may be detected in the air samples (Attachment G).
- Indoor Air Testing Resident Instructions: Instructions will be provided as information to residents regarding the steps that should be taken to help ensure the integrity of the air samples (Attachment H).

4.4.3 Sampling Methodology

Sampling methodology used will be consistent with U.S. EPA protocols for the collection of air samples using TO-15 Summa™ canister sampling and analysis methodology (U.S. EPA 1999). Sampling for each air sampling type is discussed below. Each canister will be certified cleaned by the selected laboratory according to its QAPP and U.S. EPA Method TO-15. For the analytical testing, TO-15 SIM will be used for the indoor air samples to obtain lower detection limits for chlorinated solvents. Severn Trent Laboratories (STL) will conduct the analytical work for the site. Turn around times will vary dependant on where and when the sample is collected. Baseline samples from residences previously sampled by the U.S. EPA will be analyzed with standard turn around times (14 calendar days) requested; baseline samples from residences not previously sampled will be analyzed with rush turn around times (24-48 hours) requested; and all sampling subsequent to installation of residential treatment systems will be analyzed with standard turn around times requested.

4.4.4 Sub-slab Air Sampling

Sub-slab sample ports will be installed and sampled in accordance with the Response Engineering and Analytical Contract (REAC) SOP #2082. A copy of the SOP is included in Attachment I. Note that a vacuum equipped with a HEPA filter may be used during installation activities to minimize impact to the residents.

Sample Collection

Soil gas will be collected using 6-liter Summa™ canisters fitted with a flow orifice pre-calibrated to collect a 6-liter sample over a twenty-four hour period. Once the 24-hour sampling period is completed, the Summa™ canisters will be boxed and shipped to the laboratory for analyses of TO-15 SIM analytes. A brief outline of the sampling protocol is provided below.

At the start of the sampling event, a pressure gauge reading will be performed. Values will be recorded. Flow rates will be less than 200 mL/min and sampling will continue until a complete 24-hour sample has been collected. At the end of the sampling event, a pressure gauge reading will be performed. Values will be recorded. If the final volume of sample is greater than 4-liters, and the canister is still under vacuum (>2 in. Hg), the sample will be considered valid.

The 6-liter Summa™ canister with a calibrated 24-hour orifice will be connected to the stainless steel vapor probe using Teflon™ tubing. Note that collection with a calibrated orifice will ensure that the flow rate is not greater than 200 mL/min, which is the flow threshold above which VOC stripping from soil might occur (CalEPA 2003). After the sample is collected, the safety cap will be installed.

All data concerning sample collection will be documented in a field notebook and the samples will be handled as documented under the QAPP.

4.4.5 Indoor Air Sampling

A physical survey of the buildings to be sampled will be conducted, in conjunction with an interview of the occupants of the buildings. The purpose of the physical survey is to obtain data that will allow a qualitative assessment of factors that potentially could influence indoor air quality. The physical survey includes collecting information on aspects of the building configuration such as building layout, attached garages, utility entrances into the building, ventilation system design, foundation conditions, presence of foundation sump, building material types (e.g. recent carpeting/linoleum and/or painting), presence of fireplace, location of laundry facilities, etc. The physical survey also includes collecting data related to indoor air quality such as use of cleaning products, dry-cleaner use, carpet cleaning services, indoor storage of paints and/or petroleum hydrocarbon products, use of aerosol consumer products, smoking, hobby crafts, etc. During the physical survey, the basement will be pre-screened with a PPB-RAE to determine if any chemicals may be present in the sampling area.

The indoor air samples will be collected using a Summa™ canister (6-liter capacity) equipped with a critical orifice flow regulation device sized to allow the collection of an air sample over a

24-hour sampling period. Samples will be collected from the basements or crawl spaces in order to determine the potential for vapors to come from the subsurface. Care will be taken to deploy the Summa^{TM} canisters away from the direct influence of any forced air emanating from air conditioning units, central air conditioning vents, furnaces or heaters.

The indoor air sampling procedure is described as follows:
Building spaces will be examined to determine a location for deployment of the Summa^{TM} sample canister as close as practical to the center of the space. In the case of a basement, the location will be representative of the breathing zone or approximately 1 meter above the floor level. An attempt will be made deploy the canister in areas that are not subject to disturbances, or locations that interfere with the occupant's normal activities.

Air sample canisters will be labeled with a unique sample designation number. Both the sample number and the sample location information will be recorded on the Indoor Air Sampling Field Form (Attachment J).

The Summa^{TM} canister vacuum will be measured using an integrated vacuum gauge immediately prior to canister deployment, and recorded on the Indoor Air Sampling Field Data Sheet. The critical orifice flow controller will be installed, as supplied by the laboratory, on the canister and the canister will be opened fully at the beginning of sample collection period and start time recorded on the Indoor Air Sampling Field Data Sheet.

Other data recorded on the Indoor Air Sampling Field Data Sheet will include: outside and interior temperatures both at the start and end of the sample period, basement depth, equipment serial numbers, sampler name, and any comments. Photographic documentation of the sampling event will be conducted, including the address of the sampling event, if permitted by the property owner, and summarized on the Household Information Form.

The canister valve will be closed fully at the end of the sample period (after 24 hours) and the end time recorded on the field data sheet. If there is evidence of canister disturbance during the sample collection, this will be recorded on the Indoor Air Sampling Field Data Sheet.

The Summa^{TM} canister vacuum will be measured immediately after canister retrieval at the end of the sample period and recorded on the field data sheet. Any samples where the canister reached atmospheric pressure will be rejected and the canisters returned for cleaning. Once the vacuum is measured, the safety cap will be securely tightened on the inlet of the Summa™ canister. Field data will be verified as correctly entered into field books prior to shipment and canisters will be shipped to the laboratory under a chain of custody.

Residents will be requested to keep out of the sampling area during the sampling event, if possible.

4.5 REPORTING

4.5.1 Investigation Technical Memorandum

Upon completion of the investigation, a technical memorandum detailing the findings of the sampling will be prepared. Items to be presented in the report include:

- Documentation of the field sampling event
- Evaluation of the resulting data
- Calibration Data
- Laboratory Analytical Data and Chain of Custody
- Conclusions

The technical memorandum will be submitted to the U.S. EPA 30 days after receipt of validated lab data from all sampling locations. Three hard copies and one electronic PDF file will be provided.

4.5.2 Progress Update Meetings

A weekly conference call will be conducted to discuss the progress of the Phase 1 Work Plan during the first 45 days of the project. The following representatives will be invited to participate in the weekly call:

- DaimlerChrysler Project Staff
- EPA OSC
- EPA START
- Earth Tech
- Ohio EPA
- Ohio Department of Health
- Montgomery County Health Department

DaimlerChrysler will arrange a conference call bridge, distribute a weekly call reminder and the latest project sample results prior to the call. The weekly conference call agenda will include:

1) Latest Validated Sample Results (Project Status Spreadsheet)
2) SSDS Installation Status and Installation times/date
3) Plans for the next week
4) Project Issues
5) Access Team Update

5. SYSTEM INSTALLATION

Based on the indoor air sampling conducted by U.S. EPA, the installation of eight sub-slab depressurization systems will occur, if access is granted; one within the basement of each of the following residences:

Non-Responsive

[redacted]

In the event that test results from indoor air sampling of the additional residences sampled under Task 3 are higher than the TCE residential screening level of 0.4 ppbv provided by U.S. EPA, a sub-slab depressurization system will be installed in those additional residences, if access is granted.

Access agreements should be retained for each residence. A sample Property Access and Activity Agreement is included in Attachment K.

The objective of the depressurization systems is to reduce exposure of the building occupants to elevated indoor air concentrations of TCE within the residences. DaimlerChrysler Corporation will work closely with the contractors responsible for the installation of the systems to ensure proper installation and operation of the systems. A description of the technology and installation procedures is outlined in the following sections.

5.1 SYSTEM CHARACTERISTICS

Sub-slab depressurization technology consists of the creation of a suction point located in the basement connected to a high static suction fan. The suction fan will be mounted outdoors and will be mounted directly on the system piping and fastened to a supporting structure by means of mounting brackets. On average, the suction fan will provide coverage of 2,000 square feet per slab penetration. This coverage may vary depending upon the sub-slab material. In general, the tighter the material, the smaller the area covered per slab penetration. The suction fan will operate continuously to vent the subsurface beneath the basement slab.

5.2 System Installation

Installation of the sub-slab depressurization system will be conducted by Air Quality Control Agency, a knowledgeable contractor with experience in installing similar systems in the Dayton, Ohio area. The contractor shall follow the methods outlined in *ASTM Standard E 2121-03 – Standard Practice for Installing Radon Mitigation Systems in Existing Low-Rise Residential Buildings*. Prior to installing the mitigation system, DaimlerChrysler Corporation and the contractor will consult with the resident and evaluate the residence to determine the location where the system will be most effective and convenient. All local building codes shall be followed during installation of the system.

Installation will begin with the creation or determination of a sub-slab suction point within the basement of each residence. The location of the suction point will be as far from the existing sub-slab air sampling locations as possible. A portion of the basement slab will be cored and/or saw-cut using a concrete coring tool, saw or other appropriate tool, and the concrete removed. A small excavated hole will be created in the sub-slab material where the end of the suction point pipe will be placed. The size of the excavated hole will vary depending on the permeability of the sub-slab material. 3-inch diameter Schedule 40 polyvinyl chloride (PVC) piping will be routed from the suction point, through the slab and outside the basement through a wall penetration. The pipe will then be connected to a suction fan and the exhaust piping will be routed to the roof-line, taking care to exhaust the air above any nearby intake pipes or building windows.

Any openings around the suction point penetration, utility penetrations, and other openings in the slab will be appropriately sealed.

The power supply for the fan will be locked to prevent accidental shut-off of the system. Residents will be supplied with a key to allow for the power to be turned off for maintenance purposes. A typical sub-slab depressurization system is illustrated in Figure 2.

A permanent vacuum gauge will be installed on each system on the suction side of the fan. Following startup of the system, an initial vacuum reading will be recorded.

5.3 Operation and Maintenance Manual

Following installation activities, an operation and maintenance manual will be supplied to each resident. In addition, keys to the power supply for the fan will also be supplied to each resident. Contents of the operation and maintenance manual will include, but not be limited to, the following information:

- Operator's manual for the system
- Contact information sheet
- System life expectancy
- Pre and post installation sampling results
- Photographic documentation (if available)
- Copy of the Access Agreement (if available)
- Link to the U.S. EPA website
- Warranty information

6. POST SYSTEM INSTALLATION MONITORING

Post system installation monitoring will be conducted to ensure proper operation of the sub-slab depressurization systems. All monitoring will be conducted in accordance with the sampling procedures outlined in Section 4.0: Sampling Plan. Access to conduct this monitoring will follow the same criteria as initial access to the residential properties. Once best efforts have been completed, monitoring will be considered complete.

Following system installation activities, indoor air and sub-slab air sampling will be conducted at the residences on the following timeline:

- Initial post system installation sample will be taken within approximately 10 days of installation completion
- The second sample will be taken within approximately 30 days of the initial post system installation sample
- The third sample will be taken within approximately 180 days of the initial post system installation sample
- The fourth sample will be taken within approximately 1 year of the initial post system installation sample
- Sampling will be scheduled and completed annually following the first year

Copies of the monitoring data will be submitted to the U.S. EPA and the Montgomery County Health Department. In addition, results will be forwarded to the individual residents for inclusion in their Operation and Maintenance manual.

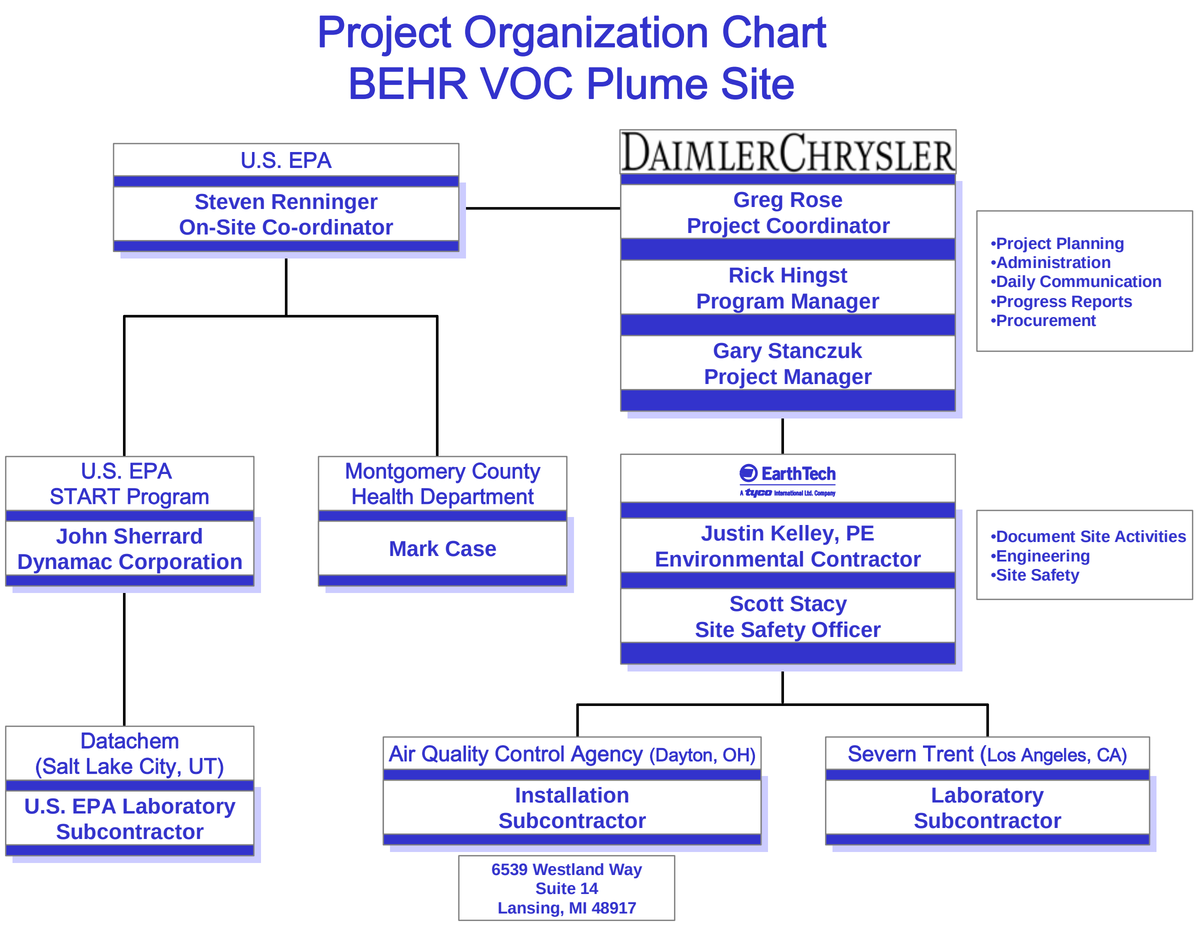
During each sampling event, an inspection of the system will be conducted. System inspection activities will include:

- System vacuum/pressure readings
- Confirm operation of the blower fan
- Visual inspection of system piping and components
- Inspect floor and wall seals
- Confirm operation with residents

7. PROJECT MANAGEMENT

7.1 RESPONSIBILITIES AND FUNCTIONS

The work outlined in this work plan will be managed as per the following project organization chart.



Contact numbers for each member are given in Table 2.

Table 2 – Contact List

Contact Name	Phone #
Steven Renninger (U.S. EPA)	(513) 569-7539
John Sherrard (Dynamac)	(513) 703-3092
Mark Case (Montgommery County Health Department)	(937) 225-4429
Greg Rose (DCC)	(248) 576-7362
Rick Hingst (DCC)	(248) 576-7371
Gary Stanczuk (DCC)	(248) 576-7365
Justin Kelley (Earth Tech)	(734) 779-0364
Scott Stacy (Earth Tech)	(734) 779-2819
Jamey Gelina (Air Quality Control Agency)	(800) 420-3881

7.2 PROJECT SCHEDULE

A general project schedule has been included in Attachment L. The sub-slab vapor probe sampling, indoor air sampling, and, if required based on sampling results, the SSDS installation, will be completed for each property covered by Phase I within 45 days of the date access is obtained for such property.

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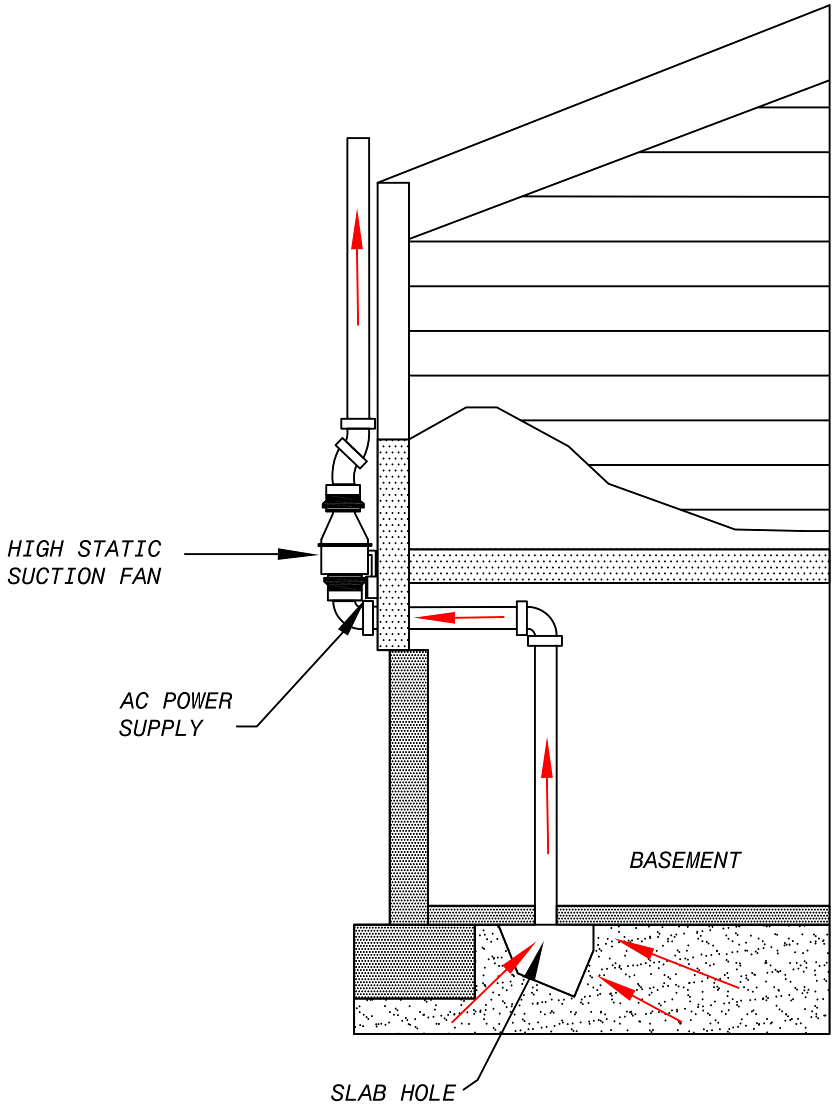
Figures

Non-Responsive



EarthTech
A Tyco International Ltd. Company
5555 Glenwood Hills Parkway, SE • Suite 200–300 • Grand Rapids, MI 49512 • (616) 942–9600

DRAWN BY: VM	DATE: NOVEMBER 2006
CHECKED BY: SC	EDITED BY: VM111606
FILE NAME: Sub Slab Schematic.dwg	

FIGURE NO. 2

SUB–SLAB VENTILATION
TYPICAL INSTALLATION

DAYTON THERMAL PRODUCTS
DAYTON, OHIO

PROJECT NUMBER	63787	SCALE: NOT TO SCALE

Attachment A

Administrative Order

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5

IN THE MATTER OF:

Behr VOC Plume Site
Dayton, Montgomery County, Ohio

Respondent:

Daimler Chrysler Corporation

ADMINISTRATIVE SETTLEMENT AGREEMENT AND ORDER ON CONSENT FOR REMOVAL ACTION

Docket No. ______________________

Proceeding Under Sections 104, 106(a), 107 and 122 of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, 42 U.S.C. ' ' 9604, 9606(a), 9607 and 9622

TABLE OF CONTENTS

I. JURISDICTION AND GENERAL PROVISIONS

1. This Administrative Settlement Agreement and Order on Consent (ASettlement Agreement@) is entered into voluntarily by the United States Environmental Protection Agency (AU.S. EPA@) and Daimler Chrysler Corporation ("DCC"), hereinafter the Respondent. This Settlement Agreement provides for the performance of removal actions by Respondent and the reimbursement of certain response costs incurred by the United States at or in connection with the property located in the vicinity of 1600 Webster Street in Dayton, Montgomery County, Ohio, the ABehr VOC Plume Site,@ the "BVP Site" or the ASite.@ The Site is described further in Section III, Paragraph 8(j) of this Settlement Agreement.

2. This Settlement Agreement is issued under the authority vested in the President of the United States by Sections 104, 106(a), 107 and 122 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. '' 9604, 9606(a), 9607 and 9622, as amended (ACERCLA@). This authority has been delegated to the Administrator of the U.S. EPA by Executive Order No. 12580, January 23, 1987, 52 Federal Register 2923, and further delegated to the Regional Administrators by U.S. EPA Delegation Nos. 14-14-A, 14-14-C and 14-14-D, and to the Director, Superfund Division, Region 5, by Regional Delegation Nos. 14-14-A, 14-14-C and 14-14-D.

3. U.S. EPA has notified the State of Ohio (the AState@) of this action pursuant to Section 106(a) of CERCLA, 42 U.S.C. ' 9606(a).

4. U.S. EPA and Respondent recognize that this Settlement Agreement has been negotiated in good faith and that the actions undertaken by Respondent in accordance with this Settlement Agreement do not constitute an admission of any liability. Respondent does not admit, and retains the right to controvert in any subsequent proceedings other than proceedings to implement or enforce this Settlement Agreement, the validity of the findings of facts, conclusions of law, and determinations in Sections IV (Findings Of Fact) and V (Conclusions Of Law And Determinations) of this Settlement Agreement. Respondent agrees to comply with and be bound by the terms of this Settlement Agreement and further agrees that Respondent will not contest the basis or validity of this Settlement Agreement or its terms.

II. PARTIES BOUND

5. This Settlement Agreement applies to and is binding upon U.S. EPA and upon Respondent and its successors and assigns. Any change in ownership or corporate status of the Respondent including, but not limited to, any transfer of assets or real or personal property shall not alter the Respondent=s responsibilities under this Settlement Agreement.

6. Respondent is jointly and severally liable for carrying out all activities required by this Settlement Agreement.

7. Respondent shall ensure that its contractors, subcontractors, and representatives

comply with this Settlement Agreement. Respondent shall be responsible for any noncompliance with this Settlement Agreement except noncompliance by U.S. EPA, U.S. EPA contractors, the Ohio Environmental Protection Agency (Ohio EPA), or Ohio EPA's contractors.

III. DEFINITIONS

8. Unless otherwise expressly provided herein, terms used in this Settlement Agreement which are defined in CERCLA or in regulations promulgated under CERCLA shall have the meaning assigned to them in CERCLA or in such regulations. Whenever terms listed below are used in this Settlement Agreement or in the appendices attached hereto and incorporated hereunder, the following definitions shall apply:

a. ACERCLA@ shall mean the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. '' 9601, *et seq*.

b. AEffective Date@ shall be the effective date of this Settlement Agreement as provided in Section XXX (Effective Date).

c. AResponse Costs@ shall mean all costs, including direct and indirect costs, that the United States incurs in reviewing or developing plans, reports and other items pursuant to this Settlement Agreement, verifying the Work, or otherwise implementing, overseeing, or enforcing this Settlement Agreement on or after the Effective Date. Response Costs shall also include all costs, including direct and indirect costs, that the United States incurred at or in connection with the Site during the period beginning on September 25, 2006 and ending on the Effective Date.

d. AInterest@ shall mean interest at the rate specified for interest on investments of the U.S. EPA Hazardous Substance Superfund established by 26 U.S.C. ' 9507, compounded annually on October 1 of each year, in accordance with 42 U.S.C. ' 9607(a). The applicable rate of interest shall be the rate in effect at the time the interest accrues. The rate of interest is subject to change on October 1 of each year.

e. ANational Contingency Plan@ or ANCP@ shall mean the National Oil and Hazardous Substances Pollution Contingency Plan promulgated pursuant to Section 105 of CERCLA, 42 U.S.C. ' 9605, codified at 40 C.F.R. Part 300, and any amendments thereto.

f. ASettlement Agreement@ shall mean this Administrative Settlement Agreement and Order on Consent and all appendices attached hereto (listed in Section XXIX (Severability/Integration/Attachments)). In the event of conflict between this Settlement Agreement and any appendix, this Settlement Agreement shall control.

g. AParties@ shall mean U.S. EPA and Respondent.

h. ARCRA@ shall mean the Solid Waste Disposal Act, as amended, 42 U.S.C. '' 6901, *et seq.* (also known as the Resource Conservation and Recovery Act).

i. ARespondent@ shall mean Daimler Chrysler, a Delaware Corporation.

j. ASite@ shall mean the Behr VOC Plume Superfund Site, encompassing the areal extent of the undefined groundwater contamination plume originating from the Behr-Dayton Thermal Systems LLC facility (the Behr-Dayton facility) located at 1600 Webster Street, Dayton, Montgomery County, Ohio, and a residential area south of the Behr-Dayton facility, including but not limited to Daniel Street, Lamar Street, and Milburn Avenue and depicted generally on the map attached as Attachment B.

k. AState@ shall mean the State of Ohio.

l. AU.S. EPA@ shall mean the United States Environmental Protection Agency and any successor departments or agencies of the United States.

m. AWaste Material@ shall mean 1) any Ahazardous substance@ under Section 101(14) of CERCLA, 42 U.S.C. ' 9601(14); 2) any pollutant or contaminant under Section 101(33) of CERCLA, 42 U.S.C. ' 9601(33); 3) any Asolid waste@ under Section 1004(27) of RCRA, 42 U.S.C. ' 6903(27); and/or 4) any Ahazardous waste@ under Ohio Revised Code Chapter 3734.01(j).

n. AWork@ shall mean all activities Respondent is required to perform under this Settlement Agreement.

IV. <u>FINDINGS OF FACT</u>

9. Based on available information, including the Administrative Record in this matter, U.S. EPA hereby finds that:

a. The Behr-Dayton facility is located at 1600 Webster Street, Dayton, Montgomery County, Ohio, near a residential area, and approximately 1 mile north of the Downtown Dayton.

b. Behr-Dayton Thermal Systems LLC is a Delaware limited liability company which currently owns and operates the Behr-Dayton facility.

c. Behr Dayton Thermal Systems LLC manufactures vehicle air conditioning and engine cooling systems at the facility.

d. Respondent Daimler Chrysler Corporation (“DCC”) is a Delaware corporation that owned and operated the Behr-Dayton facility from at least 1937 until April of 2002.

e. Respondent DCC manufactured air conditioning equipment at the Behr-Dayton facility.

f. During Respondent's ownership of the Behr-Dayton facility, hazardous substances, including trichloroethene (TCE), were released at and from the Behr-Dayton facility.

g. The groundwater beneath the Behr-Dayton facility is contaminated with volatile organic compounds, including trichloroethene (TCE).

h. TCE is a hazardous substance within the meaning of Section 101 (14) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). It is a **"**listed hazardous substance" as that term is defined at 40 CFR § 302.4, and is included in Table 302.4 as a hazardous substance designated under Section 102(a) of CERCLA.

i. TCE is a man-made chemical that is widely used as a cleaner to remove grease from metal parts.

j. The Agency for Toxic Substances and Disease Registry ("ATSDR") reports that inhalation exposure to TCE at very high concentrations may affect the central nervous system, with symptoms such as dizziness, headaches, confusion, euphoria, facial numbness, and weakness.

k. ATSDR and the Ohio Department of Health ("ODH") have established TCE screening and action levels for residential and commercial sub-slab and indoor air. The ATSDR residential indoor air screening level is 0.4 parts per billion (ppb) and the action level is 100 ppb. The ATSDR residential sub-slab screening level is 4 ppb and the action level is 1,000 ppb. The ATSDR commercial sub-slab screening level is 17 ppb. The ATSDR commercial indoor air screening level is 1.7 ppb. The U.S. Department of Labor, Occupational Safety and Health Administration ("OSHA") has established an employee exposure limit of 100 parts per million (ppm) (8-hour time weighted average), with an acceptable ceiling concentration of 200 ppm and an acceptable maximum peak concentration of 300 ppm above the acceptable ceiling level concentration for an 8-hour shift, with a maximum duration of 5 minutes in any 2 hours. (See 29 CFR 1910.1000 Table Z-2.)

l. Respondent contracted Earth Tech to design, install, and operate two systems for the remediation of soil and groundwater contamination under the Behr-Dayton facility, with TCE as the main contaminant of concern. Earth Tech installed a Soil Vapor Extraction (SVE) system on the Behr-Dayton facility property for soil remediation and began operation in October 2003. The system was operated through December 2005. Based on the extracted air concentrations, the SVE system removed a total of 900 pounds of VOCs.

m. Earth Tech installed a groundwater remediation system on the Behr-Dayton facility property and began operation in June 2004. Through December 2005, the groundwater system had removed a total of 1031 pounds of VOCs, and dechlorinated 325 pounds of VOCs.

n. The TCE contaminated ground water has migrated to the South to a residential area located across Leo Street from the Behr-Dayton facility, including but not limited to Daniel Street, Lamar Street, and Milburn Avenue.

o. Earth Tech has conducted quarterly monitoring on a network of 75 on-site and off-site groundwater monitoring wells since 2001. In 2003, the following monitoring wells were sampled and contained elevated levels of TCE: MW010s (17,000 ppb), MW028s (9,600 ppb), and MW029s (16,000 ppb). These monitoring wells are located along the southern perimeter of the Behr-Dayton facility (MW010s) or in the adjacent neighborhood (MW028s and MW029s).

p. On September 28, 2006, Earth Tech submitted the most recent quarterly groundwater sampling results to Ohio EPA. In the report, Earth Tech stated that one shallow groundwater monitoring well, MW038s, which is located at the intersection of Daniel Street and Lamar Street (residential area south of Behr Dayton facility), contained a TCE concentration of 3,900 ppb.

q. The Maximum Contaminant Level (MCL) for TCE is 5 ppb.

r. Groundwater in the area of the Behr-Dayton facility is located approximately 20 feet below ground surface.

s. On October 16, 2006, Ohio EPA installed a total of seven soil gas probes along Daniel Street, Lamar Street and Milburn Avenue to evaluate potential risk posed by vapor intrusion from a VOC groundwater plume. The depth of the soil gas probes were approximately one to two feet above the depth of groundwater, which was determined to be approximately 20 feet below ground surface. Once the soil probes were installed, an air sample was collected and analyzed for VOCs using EPA Method TO-14 modified.

t. Ohio EPA soil gas analytical results detected TCE concentrations at the following levels:

Sample ID	SG-1	SG-2	SG-3	SG-4	SG-5	SG-6	SG-7
TCE (ppb)	120,000	70,000	160,000	140,000	13,000	16,000	12,000

u. At the request of the Ohio EPA, the U.S. EPA conducted a simultaneous vapor intrusion investigation. In October and November 2006, the U.S. EPA collected sub-slab air samples from eight residences located south of the Behr-Dayton facility along Milburn Avenue, Daniel Street and Leo Street. TCE concentrations were detected at the following levels:

Sample ID	EPA-01-55	EPA-01-552	EPA-02-55	EPA-03-55	EPA-01-55*	EPA-05-55	EPA-06-55	EPA-07-55
TCE (ppb)	14,000	6,980	18,000	16,000	260	62,000	3,700	62,000

v.   The results of the sub-slab testing indicates that eight samples exceed the ATSDR residential TCE sub-slab screening level of 4 parts per billion by volume (ppbv) and four samples exceed the ATSDR residential TCE sub-slab immediate action level of 1,000 ppbv.

w. Based on ATSDR and Ohio Department of Health (“ODH”) recommendations, the U.S. EPA followed sub-slab air sampling with indoor air sampling at eight locations in November 2006. TCE concentrations were detected at the following levels:

Sample ID	EPA-01-1A	EPA-02-1A	EPA-03-1A	EPA-04-1A	EPA-05-1A	EPA-06-1A	EPA-07-1A	EPA-08-1A
TCE (ppb)	1.2	180	130	13	260	7.5	0.4	49

The results of the indoor air sampling indicate that eight samples exceed the ATSDR residential TCE indoor air screening level of 0.4 ppbv and three samples exceed the ATSDR residential TCE indoor air immediate action level of 100 ppbv.

x. In a letter dated November 6, 2006, the Ohio EPA formally requested U.S. EPA assistance in conducting a time-critical removal action at the BVP Site. Ohio EPA made the following reference as the basis for its referral letter:

> "TCE concentrations in soil gas were as high as 160,000 ppbv. U.S. EPA sub-slab samples collected from October 11 to October 23 contained TCE at concentrations up to 62,000 ppbv. TCE concentrations in ground water samples collected by DaimlerChrysler in March 2006 were as high as 3,900 ppb beneath the residential area."

y. On November 7, 2006, U.S. EPA issued a general notice of potential liability under CERCLA to Behr-Dayton Thermal Systems LLC and DCC, revealing concerns about conditions at the Site. The general notice sought a commitment to perform the removal and reimburse U.S. EPA its costs incurred in connection with the Site.

z. Respondent DCC responded by letter dated November 20, 2006, indicating its commitment to address conditions at the Behr VOC Plume Site consistent with applicable law and regulation, and that it is willing to enter into an appropriate AOC that will delineate the scope of its responsibilities with respect to performing response actions at the Site and for reimbursement of necessary response costs incurred consistent with the National Contingency Plan.

V. CONCLUSIONS OF LAW AND DETERMINATIONS

10. Based on the Findings of Fact set forth above, and the Administrative Record supporting this removal action, U.S. EPA has determined that:

a. The Behr VOC Plume Site is a Afacility@ as defined by Section 101(9) of CERCLA, 42 U.S.C. ' 9601(9).

b. The contamination found at the Site, as identified in the Findings of Fact above, includes Ahazardous substances@ as defined by Section 101(14) of CERCLA, 42 U.S.C. ' 9601(14).

c. Respondent is a Aperson@ as defined by Section 101(21) of CERCLA, 42 U.S.C. ' 9601(21).

d. Respondent is a responsible party under Section 107(a) of CERCLA, 42 U.S.C. ' 9607(a), and is jointly and severally liable for performance of response action and for response costs incurred and to be incurred at the Site.

i. Respondent Daimler-Chrysler is the Aowner@ and/or Aoperator@ of the facility at the time of disposal of hazardous substances at the facility, as defined by Section 101(20) of CERCLA, 42 U.S.C. ' 9601(20), and within the meaning of Section 107(a)(2) of CERCLA, 42 U.S.C. ' 9607(a)(2); and/or persons who arranged for disposal or treatment, or arranged with a transporter for transport for disposal or treatment of hazardous substances at the facility, within the meaning of Section 107(a)(3) of CERCLA, 42 U.S.C. ' 9607(a)(3); and/or persons who accept or accepted hazardous substances for transport to the facility, within the meaning of Section 107(a)(4) of CERCLA, 42 U.S.C. ' 9607(a)(4).

ii. The conditions described in the Findings of Fact above constitute an actual or threatened Arelease@ of a hazardous substance from the facility into the Aenvironment@ as defined by Sections 101(22) and 101(8) of CERCLA, 42 U.S.C.'' 9601(22) and 9601(8).

e. The conditions present at the Site constitute a threat to public health, welfare, or the environment based upon the factors set forth in Section 300.415(b)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan, as amended ("NCP"), 40 CFR '300.415(b)(2). These factors include, but are not limited to, the following:

i. Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances, pollutants or contaminants. This factor is present at the Site due to the existence of TCE in the groundwater beneath residences south of the Behr-Dayton facility, and the migration of TCE vapors into residential homes

Vapor intrusion occurs when vapors produced by a chemical spill or groundwater contamination plume migrate through soil into the foundations of structures and into the indoor air. When chemicals are spilled on the ground, they will seep into the soil and make their way into the groundwater. VOCs, including TCE, produce vapors that travel through soil. These vapors can enter a home through cracks in the foundation or into a basement with a dirt floor or concrete slab.

TCE is a hazardous substance within the meaning of Section 101 (14) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) because it is listed at 40 CFR Section 302.4. Historical groundwater sampling, Ohio EPA soil gas sampling, and U.S. EPA sub-slab and indoor air sampling results indicate that TCE vapors have migrated into residential homes at levels that have been determined by ATSDR and ODH to require action to protect human health.

The Agency for Toxic Substances and Disease Registry ("ATSDR") reports that inhalation exposure to TCE at very high concentrations may affect the central nervous system, with symptoms such as dizziness, headaches, confusion, euphoria, facial numbness, and weakness.

U.S. EPA has documented eight residences exceed the ATSDR TCE sub-slab screening level of 4 ppbv and four residences exceed the ATSDR TCE sub-slab immediate action level of 1,000 ppbv. Sub-slab levels were documented as high as 62,000 ppbv. In addition, U.S. EPA has documented eight residences exceed the ATSDR TCE indoor air screening level of 0.4 ppbv and three residences exceed the ATSDR TCE indoor air immediate action level of 100 ppbv.

ii. **The unavailability of other appropriate federal or state response mechanisms to respond to the release.** This factor supports the actions required by this Settlement Agreement at the Site because Ohio EPA requested U.S. EPA Region 5 assistance with conducting a time-critical removal action at the Site, and the State of Ohio and local agencies do not have the funds to undertake the removal action at this Site.

f. The removal action required by this Settlement Agreement is necessary to protect the public health, welfare, or the environment and, if carried out in compliance with the terms of this Settlement Agreement, will be considered consistent with the NCP, as provided in Section 300.700(c)(3)(ii) of the NCP.

VI. SETTLEMENT AGREEMENT AND ORDER

11. Based upon the foregoing Findings of Fact, Conclusions of Law, Determinations, and the Administrative Record for this Site, it is hereby Ordered and Agreed that Respondent shall comply with all provisions of this Settlement Agreement, including, but not limited to, all attachments to this Settlement Agreement and all documents incorporated by reference into this Settlement Agreement.

VII. DESIGNATION OF CONTRACTOR, PROJECT COORDINATOR, AND ON-SCENE COORDINATOR

12. Respondent may retain one or more contractors to perform the Work and shall notify U.S. EPA of the name(s) and qualifications of such contractor(s) within 5 business days of the Effective Date. Respondent shall also notify U.S. EPA of the name(s) and qualification(s) of any other contractor(s) or subcontractor(s) retained to perform the Work at least 5 business days prior to commencement of such Work. U.S. EPA retains the right to disapprove of any or all of the contractors and/or subcontractors retained by Respondent. If U.S. EPA disapproves of a selected contractor, Respondent shall retain a different contractor and shall notify U.S. EPA of that contractor=s name and qualifications within 3 business days of U.S. EPA=s disapproval.

13. Respondent has designated a Project Coordinator who shall be responsible for administration of all actions by Respondent required by this Settlement Agreement and shall

submit to U.S. EPA the designated Project Coordinator=s qualifications. The designated Project Coordinator's name, address and telephone number are set forth below. To the greatest extent possible, the Project Coordinator shall be present on Site or readily available during Site work. Receipt by Respondent's Project Coordinator of any notice or communication from U.S. EPA relating to this Settlement Agreement shall constitute receipt by Respondent.

Gregory M. Rose, Senior Manager
Environmental Risk Management
Daimler Chrysler Corporation
800 Chrysler Drive
Auburn Hills, MI 48/326-2757
(248) 576-7362
Gmr4@Daimler Chrysler.com

14. U.S. EPA has designated Steve Renninger of the Emergency Response Branch, Region 5, as its On-Scene Coordinator (AOSC@). Except as otherwise provided in this Settlement Agreement, Respondent shall direct all submissions required by this Settlement Agreement to the OSC at the following address:

Steve Renninger, On-Scene Coordinator
U.S. EPA Region V
Emergency Response Branch
26 West Martin Luther King Drive (G41)
Cincinnati, OH 45268

Respondent is encouraged to make its submissions to U.S. EPA on recycled paper (which includes significant post consumer waste paper content where possible) and using two-sided copies.

15. U.S. EPA and Respondent shall have the right, subject to Paragraphs 13 and 14, to change their respective designated OSC or Project Coordinator. U.S. EPA shall notify the Respondent, and Respondent shall notify U.S. EPA, as early as possible before such a change is made, but in no case less than 24 hours before such a change. The initial notification may be made orally but it shall be promptly followed by a written notice.

VIII. WORK TO BE PERFORMED

16. Respondent shall perform, at a minimum, the following removal activities:

a. Develop and implement a Site Health and Safety Plan, including an Emergency Contingency Plan.

b. Conduct subsurface gas extent of contamination sampling at the Site utilizing groundwater, soil gas, sub-slab, and/or indoor air sampling techniques.

c. If the applicable Indoor Air Screening Level for TCE is exceeded, design and install interior TCE vapor abatement systems in structures impacted by TCE subsurface migration to meet the applicable indoor air screening level. Abatement systems may include installation of a sub-slab vapor removal system or crawl space vapor removal system, sealing cracks in walls and floors of the basement, and/or sealing or fixing drains that could be a pathway. The applicable screening levels, as set forth in paragraph 9.k, are: 1) for residential properties, the ATSDR residential indoor air screening level; 2) for commercial properties, the ATSDR commercial indoor air screening level; 3) for industrial properties, the OSHA employee exposure limits. If a property has mixed use, the more stringent standard applies.

d. Develop and implement a vapor abatement system performance sample plan to confirm that applicable indoor air screening levels are achieved for TCE following installation of the TCE vapor abatement systems. Work will not be completed at any structure until quarterly monitoring (4 continuous quarters) for sub-slab and indoor air is documented less than the applicable screening levels following termination of the installed TCE vapor abatement system operation. The OSC, in his discretion, will determine when the operation of any TCE vapor abatement system can be terminated.

17. Work Plan and Implementation.

a. Within 3 business days after the Effective Date, Respondent shall submit to U.S. EPA for approval a draft Phase I Work Plan for performing the removal actions described in Paragraph 16.a., c., and d. above for those locations already found to have exceeded the ATSDR Indoor Air Screening Level for TCE. The draft Work Plan shall provide a description of, and an expeditious schedule for, the actions required by this Settlement Agreement.

b. Within 45 calendar days after the Effective Date, Respondent shall submit to U.S. EPA for approval a draft Phase II Work Plan for performing the removal action generally described in Paragraph 16 above. The draft Work Plan shall provide a description of, and an expeditious schedule for, the actions required by this Settlement Agreement.

c. U.S. EPA may approve, disapprove, require revisions to, or modify the draft Work Plan in whole or in part. If U.S. EPA requires revisions, Respondent shall submit a revised draft Work Plan within 5 business days of receipt of U.S. EPA=s notification of the required revisions. Respondent shall implement the Work Plan as approved in writing by U.S. EPA in accordance with the schedule approved by U.S. EPA. Once approved, or approved with modifications, the Work Plan, the schedule, and any subsequent modifications shall be incorporated into and become fully enforceable under this Settlement Agreement.

d. Respondent shall not commence any Work except in conformance with the terms of this Settlement Agreement. Respondent shall not commence implementation of the Work Plan developed hereunder until receiving written U.S. EPA approval pursuant to Paragraph 17(b).

18. Health and Safety Plan. Within 3 business days after the Effective Date, Respondent

shall submit for U.S. EPA review and comment a plan that ensures the protection of the public health and safety during performance of on-Site work under this Settlement Agreement. This plan shall be prepared consistent with U.S. EPA=s Standard Operating Safety Guide (PUB 9285.1-03, PB 92-963414, June 1992). In addition, the plan shall comply with all currently applicable Occupational Safety and Health Administration (AOSHA@) regulations found at 29 C.F.R. Part 1910. The plan shall also include contingency planning. Respondent shall incorporate all changes to the plan recommended by U.S. EPA and shall implement the plan during the pendency of the removal action.

19. Quality Assurance and Sampling.

a. All sampling and analyses performed pursuant to this Settlement Agreement shall conform to U.S. EPA direction, approval, and guidance regarding sampling, quality assurance/quality control (AQA/QC@), data validation, and chain of custody procedures. Respondent shall ensure that the laboratory used to perform the analyses participates in a QA/QC program that complies with the appropriate U.S. EPA guidance. Respondent shall follow, as appropriate, AQuality Assurance/Quality Control Guidance for Removal Activities: Sampling QA/QC Plan and Data Validation Procedures@ (OSWER Directive No. 9360.4-01, April 1, 1990), as guidance for QA/QC and sampling. Respondent shall only use laboratories that have a documented Quality System that complies with ANSI/ASQC E-4 1994, ASpecifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs@ (American National Standard, January 5, 1995), and AEPA Requirements for Quality Management Plans (QA/R-2) (EPA/240/B-01/002, March 2001),@ or equivalent documentation as determined by U.S. EPA. U.S. EPA may consider laboratories accredited under the National Environmental Laboratory Accreditation Program (ANELAP@) as meeting the Quality System requirements.

b. Upon request by U.S. EPA, Respondent shall have such a laboratory analyze samples submitted by U.S. EPA for QA monitoring. Respondent shall provide to U.S. EPA the QA/QC procedures followed by all sampling teams and laboratories performing data collection and/or analysis.

c. Upon request by U.S. EPA, Respondent shall allow U.S. EPA or its authorized representatives to take split and/or duplicate samples. Respondent shall notify U.S. EPA not less than 3 business days in advance of any sample collection activity, unless shorter notice is agreed to by U.S. EPA. U.S. EPA shall have the right to take any additional samples that U.S. EPA deems necessary. Upon request, U.S. EPA shall allow Respondent to take split or duplicate samples of any samples it takes as part of its oversight of Respondent's implementation of the Work.

20. Post-Removal Site Control. In accordance with the Work Plan schedule, or as otherwise directed by U.S. EPA, Respondent shall submit a proposal for post-removal site control consistent with Section 300.415(*l*) of the NCP and OSWER Directive No. 9360.2-02. Upon U.S. EPA approval, Respondent shall implement such controls and shall provide U.S. EPA

with documentation of all post-removal site control arrangements.

21. Reporting.

a. Respondent shall submit a written progress report to U.S. EPA concerning actions undertaken pursuant to this Settlement Agreement every 30th day after the date of receipt of U.S. EPA=s approval of the Work Plan until termination of this Settlement Agreement, unless otherwise directed in writing by the OSC. These reports shall describe all significant developments during the preceding period, including the actions performed and any problems encountered, analytical data received during the reporting period, and the developments anticipated during the next reporting period, including a schedule of actions to be performed, anticipated problems, and planned resolutions of past or anticipated problems.

b. Respondent shall submit 3 copies of all plans, reports or other submissions required by this Settlement Agreement, or any approved work plan. Upon request by U.S. EPA, Respondent shall submit such documents in electronic form.

22. Final Report. Within 60 calendar days after completion of all Work required by Section VIII (Work To Be Performed) of this Settlement Agreement, Respondent shall submit to U.S. EPA's OSC for review a final report summarizing the actions taken to comply with this Settlement Agreement. The final report shall conform, at a minimum, with the requirements set forth in Section 300.165 of the NCP entitled AOSC Reports@ and with the guidance set forth in ASuperfund Removal Procedures: Removal Response Reporting B POLREPS and OSC Reports@ (OSWER Directive No. 9360.3-03, June 1, 1994). The final report shall include a good faith estimate of total costs or a statement of actual costs incurred in complying with the Settlement Agreement, a listing of quantities and types of materials removed off-Site or handled on-Site, a discussion of removal and disposal options considered for those materials, a listing of the ultimate destination(s) of those materials, a presentation of the analytical results of all sampling and analyses performed, and accompanying appendices containing all relevant documentation generated during the removal action (*e.g.*, manifests, invoices, bills, contracts, and permits). The final report shall also include the following certification signed by a person who supervised or directed the preparation of that report:

> AUnder penalty of law, I certify that to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of the report, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.@

23. Off-Site Shipments.

a. For work at the Site authorized under this Settlement Agreement, Respondent shall, prior to any off-Site shipment of Waste Material from the Site to an out-of-state waste management facility, provide written notification of such shipment of Waste Material to the appropriate state environmental official in the receiving facility=s state and to the On-Scene Coordinator. However, this notification requirement shall not apply to any off-Site shipments when the total volume of all such shipments will not exceed 10 cubic yards.

i. Respondent shall include in the written notification the following information: 1) the name and location of the facility to which the Waste Material is to be shipped; 2) the type and quantity of the Waste Material to be shipped; 3) the expected schedule for the shipment of the Waste Material; and 4) the method of transportation. Respondent shall notify the state in which the planned receiving facility is located of major changes in the shipment plan, such as a decision to ship the Waste Material to another facility within the same state, or to a facility in another state.

ii. The identity of the receiving facility and state will be determined by Respondent following the award of the contract for the removal action. Respondent shall provide the information required by Paragraph 23(a) and 23(b) as soon as practicable after the award of the contract and before the Waste Material is actually shipped.

b. Before shipping any hazardous substances, pollutants, or contaminants from work conducted at the Site authorized under this Settlement Agreement to an off-site location, Respondent shall obtain U.S. EPA=s certification that the proposed receiving facility is operating in compliance with the requirements of CERCLA Section 121(d)(3), 42 U.S.C. ' 9621(d)(3), and 40 C.F.R. ' 300.440. Respondent shall only send hazardous substances, pollutants, or contaminants from the Site to an off-site facility that complies with the requirements of the statutory provision and regulation cited in the preceding sentence for work at the Site authorized under this Settlement Agreement.

IX. SITE ACCESS

24. Where any action under this Settlement Agreement is to be performed in areas owned by or in possession of someone other than Respondent, Respondent shall use its best efforts to obtain all necessary access agreements 10 calendar days after the date the OSC determines that access to a particular property is necessary, or as otherwise specified in writing by the OSC. Respondent shall immediately notify U.S. EPA if after using their best efforts they are unable to obtain such agreements. For purposes of this Paragraph, Abest efforts@ includes the payment of reasonable sums of money in consideration of access. Respondent shall describe in writing its efforts to obtain access. U.S. EPA may then assist Respondent in gaining access, to the extent necessary to effectuate the response actions described herein, using such means as U.S. EPA deems appropriate. Respondent shall reimburse U.S. EPA for all costs and attorney=s fees incurred by the United States in obtaining such access, in accordance with the procedures in Section XV (Payment of Response Costs).

25. Notwithstanding any provision of this Settlement Agreement, U.S. EPA and the State retain all of their access authorities and rights, including enforcement authorities related thereto,

under CERCLA, RCRA, and any other applicable statutes or regulations.

X. ACCESS TO INFORMATION

26. Respondent shall provide to U.S. EPA, upon request, copies of all documents and information within their possession or control or that of their contractors or agents relating to the work under this Settlement Agreement at the Site or to the implementation of this Settlement Agreement, including, but not limited to, sampling, analysis, chain of custody records, manifests, trucking logs, receipts, reports, sample traffic routing, correspondence, or other documents or information related to the Work. Respondent shall also make available to U.S. EPA, for purposes of investigation, information gathering, or testimony, their employees, agents, or representatives with knowledge of relevant facts concerning the performance of the Work required by this Settlement Agreement.

27. Respondent may assert business confidentiality claims covering part or all of the documents or information submitted to U.S. EPA under this Settlement Agreement to the extent permitted by and in accordance with Section 104(e)(7) of CERCLA, 42 U.S.C. ' 9604(e)(7), and 40 C.F.R. ' 2.203(b). Documents or information determined to be confidential by U.S. EPA will be afforded the protection specified in 40 C.F.R. Part 2, Subpart B. If no claim of confidentiality accompanies documents or information when they are submitted to U.S. EPA, or if U.S. EPA has notified Respondent that the documents or information are not confidential under the standards of Section 104(e)(7) of CERCLA or 40 C.F.R. Part 2, Subpart B, the public may be given access to such documents or information without further notice to Respondent.

28. Respondent may assert that certain documents, records and other information are privileged under the attorney-client privilege, the attorney work-product privilege or any other privilege recognized by federal law. If the Respondent asserts such a privilege in lieu of providing documents, they shall provide U.S. EPA with the following: 1) the title of the document, record, or information; 2) the date of the document, record, or information; 3) the name and title of the author of the document, record, or information; 4) the name and title of each addressee and recipient; 5) a description of the contents of the document, record, or information; and 6) the privilege asserted by Respondent. However, no documents, reports or other information created or generated pursuant to the requirements of this Settlement Agreement shall be withheld on the grounds that they are privileged.

29. No claim of confidentiality shall be made with respect to any data created or generated pursuant to the requirements of this Settlement Agreement, including, but not limited to, all sampling, analytical, monitoring, hydrogeologic, scientific, chemical, or engineering data, or any other documents or information evidencing conditions at or around the Site.

XI. RECORD RETENTION

30. Until 6 years after Respondent's receipt of U.S. EPA=s notification pursuant to Section XXVI (Notice of Completion of Work), each Respondent shall preserve and retain all non-identical copies of records and documents created or generated pursuant to the requirements

of this Settlement Agreement (including records or documents in electronic form) now in its possession or control or which come into its possession or control that relate in any manner to the performance of the Work or the liability of any person under CERCLA with respect to the Site, regardless of any corporate retention policy to the contrary. Until 6 years after Respondent's receipt of U.S. EPA=s notification pursuant to Section XXVI (Notice of Completion of Work), Respondent shall also instruct its contractors and agents to preserve all documents, records, and information of whatever kind, nature or description relating to performance of the Work pursuant to this Settlement Agreement.

31. At the conclusion of this document retention period, Respondent shall notify U.S. EPA at least 60 days prior to the destruction of any such records or documents, and, upon request by U.S. EPA, Respondent shall deliver any such records or documents to U.S. EPA. Respondent may assert that certain documents, records and other information are privileged under the attorney-client privilege, attorney work product privilege, or any other privilege recognized by federal law. If Respondent asserts such a privilege, it shall provide U.S. EPA with the following: 1) the title of the document, record, or information; 2) the date of the document, record, or information; 3) the name and title of the author of the document, record, or information; 4) the name and title of each addressee and recipient; 5) a description of the subject of the document, record, or information; and 6) the privilege asserted by Respondent. However, no documents, reports or other information the creation or development of which is required by this Settlement Agreement shall be withheld on the grounds that they are privileged.

32. Respondent hereby certifies that to the best of its knowledge and belief, after thorough inquiry, it has not altered, mutilated, discarded, destroyed or otherwise disposed of any records, documents or other information (other than identical copies) relating to its potential liability regarding the Site since notification of potential liability by U.S. EPA or the State or the filing of suit against it regarding the Site and that it has fully complied and will fully comply with any and all U.S. EPA requests for information pursuant to Sections 104(e) and 122(e) of CERCLA, 42 U.S.C. '' 9604(e) and 9622(e), and Section 3007 of RCRA, 42 U.S.C. ' 6927.

XII. COMPLIANCE WITH OTHER LAWS

33. Respondent shall perform all actions required pursuant to this Settlement Agreement in accordance with all applicable local, state, and federal laws and regulations except as provided in Section 121(e) of CERCLA, 42 U.S.C. ' 6921(e), and 40 C.F.R. '' 300.400(e) and 300.415(j). In accordance with 40 C.F.R. ' 300.415(j), all on-Site actions required pursuant to this Settlement Agreement shall, to the extent practicable, as determined by U.S. EPA, considering the exigencies of the situation, attain applicable or relevant and appropriate requirements (AARARs@) under federal environmental or state environmental or facility siting laws. Respondent shall identify ARARs in the Work Plan subject to U.S. EPA approval.

XIII. EMERGENCY RESPONSE AND NOTIFICATION OF RELEASES

34. In the event of any action or occurrence during performance of the Work which causes or threatens a release of Waste Material from the Site that constitutes an emergency

situation or may present an immediate threat to public health or welfare or the environment, Respondent shall immediately take all appropriate action. Respondent shall take these actions in accordance with all applicable provisions of this Settlement Agreement, including, but not limited to, the Health and Safety Plan, in order to prevent, abate or minimize such release or endangerment caused or threatened by the release. Respondent shall also immediately notify the OSC or, in the event of his/her unavailability, the Regional Duty Officer, Emergency Response Branch, Region 5 at (312) 353-2318, of the incident or Site conditions. In the event that Respondent fails to take appropriate response action as required by this Paragraph, and U.S. EPA takes such action instead, Respondent shall reimburse U.S. EPA all costs of the response action consistent with the NCP pursuant to Section XV (Payment of Response Costs).

35. In addition, in the event of any release of a hazardous substance from the Site, Respondent shall immediately notify the OSC at (312) 353-2318 and the National Response Center at (800) 424-8802. Respondent shall submit a written report to U.S. EPA within 7 business days after each release, setting forth the events that occurred and the measures taken or to be taken to mitigate any release or endangerment caused or threatened by the release and to prevent the reoccurrence of such a release. This reporting requirement is in addition to, and not in lieu of, reporting under Section 103(c) of CERCLA, 42 U.S.C. ' 9603(c), and Section 304 of the Emergency Planning and Community Right-To-Know Act of 1986, 42 U.S.C. ' 11004, *et seq*.

XIV. AUTHORITY OF ON-SCENE COORDINATOR

36. The OSC shall be responsible for overseeing Respondent's implementation of this Settlement Agreement. The OSC shall have the authority vested in an OSC by the NCP, including the authority to halt, conduct, or direct any Work required by this Settlement Agreement, or to direct any other removal action undertaken at the Site. Absence of the OSC from the Site shall not be cause for stoppage of work unless specifically directed by the OSC.

37. Section 107(d)(1) of CERCLA, 42 U.S.C. § 9607(d)(1), provides: "Except as provided in paragraph (2), no person shall be liable under this subchapter for costs or damages as a result of actions taken or omitted in the course of rendering care, assistance, or advice in accordance with the National Contingency Plan or at the direction of an onscene coordinator appointed under such plan, with respect to an incident creating a danger to public health or welfare or the environment as a result of any releases of a hazardous substance or the threat thereof. This paragraph shall not preclude liability for costs or damages as the result of negligence on the part of such person."

XV. PAYMENT OF RESPONSE COSTS

38. Payments for Response Costs.

a. Respondent shall pay U.S. EPA all Response Costs consistent with the NCP. On a periodic basis, U.S. EPA will send Respondent a bill requiring payment that consists of an Itemized Cost Summary. Respondent shall make all payments within 60 calendar days of receipt of each bill requiring payment, except as otherwise provided in Paragraph 40 of this Settlement Agreement according to the following procedures:

i. If the payment amount demanded in the bill is for $10,000 or greater, payment shall be made to U.S. EPA by EFT in accordance with current Electronic Funds Transfer ("EFT") procedures to be provided to Respondent by U.S. EPA Region 5. Payment shall be accompanied by a statement identifying the name and address of the party(ies) making payment, the Site name, U.S. EPA Region 5, the Site/Spill ID Number B5FH, and, if any, the U.S. EPA docket number for this action. Respondent shall: 1) complete Respondent's required bank form; 2) include Mellon Bank, ABA #021030004 on the bank form; 3) include the U.S. EPA Account #68010727on the form; 4) include AD 68010727 Environmental Protection Agency@ in Field Tag 4200 of the Fedwire message; and 5) include the statement identifying the name and address of the party(ies) making payment, the Site name, the U.S. EPA Region and Site/Spill ID Number.

ii. If the amount demanded in the bill is $10,000 or less, the Settling Respondent may, in lieu of the procedures in subparagraph 38(a)(i), make all payments required by this Paragraph by a certified or cashier=s check or checks made payable to AEPA Hazardous Substance Superfund@, referencing the name and address of the party making the payment, the Site name, U.S. EPA Region 5, the Site/Spill ID Number B5FH, and, if any, the U.S. EPA docket number for this action, and shall be sent to:

U.S. Environmental Protection Agency
Region 5
P.O. Box 371531
Pittsburgh, Pennsylvania 15251-7531

b. At the time of payment, Respondent shall send notice that payment has been made to the Director, Superfund Division, U.S. EPA Region 5, 77 West Jackson Blvd., Chicago, Illinois, 60604-3590 and to Maria Gonzalez, Associate Regional Counsel, 77 West Jackson Boulevard, C-14J, Chicago, Illinois, 60604-3590.

c. The total amount to be paid by Respondent pursuant to Paragraph 38(a) shall be deposited in the Behr VOC Plume Site Special Account within the U.S. EPA Hazardous Substance Superfund to be retained and used to conduct or finance response actions at or in connection with the Site, or to be transferred by U.S. EPA to the U.S. EPA Hazardous Substance Superfund.

39. In the event that the payment for Response Costs is not made within 60 days of Respondent's receipt of a bill, Respondent shall pay Interest on the unpaid balance. The Interest on Response Costs shall begin to accrue on the date of the bill and shall continue to accrue until the date of payment. Payments of Interest made under this Paragraph shall be in addition to such other remedies or sanctions available to the United States by virtue of Respondent's failure to make timely payments under this Section, including but not limited to, payment of stipulated

penalties pursuant to Section XVIII (Stipulated Penalties).

40. Respondent may dispute all or part of a bill for Response Costs submitted under this Settlement Agreement, only if Respondent alleges that U.S. EPA has made an accounting error, or if Respondent alleges that a cost item is inconsistent with the NCP. If any dispute over costs is resolved before payment is due, the amount due will be adjusted as necessary. If the dispute is not resolved before payment is due, Respondent shall pay the full amount of the uncontested costs to U.S. EPA as specified in Paragraph 38 on or before the due date. Within the same time period, Respondent shall pay the full amount of the contested costs into an interest-bearing escrow account. Respondent shall simultaneously transmit a copy of both checks to the persons listed in Paragraph 38(b) above. Respondent shall ensure that the prevailing party or parties in the dispute shall receive the amount upon which they prevailed from the escrow funds plus interest within 20 calendar days after the dispute is resolved.

XVI. DISPUTE RESOLUTION

41. Unless otherwise expressly provided for in this Settlement Agreement, the dispute resolution procedures of this Section shall be the exclusive mechanism for resolving disputes arising under this Settlement Agreement. The Parties shall attempt to resolve any disagreements concerning this Settlement Agreement expeditiously and informally.

42. If Respondent objects to any U.S. EPA action taken pursuant to this Settlement Agreement, including billings for Response Costs, it shall notify U.S. EPA in writing of its objection(s) within 10 calendar days of such action, unless the objection(s) has/have been resolved informally. This written notice shall include a statement of the issues in dispute, the relevant facts upon which the dispute is based, all factual data, analysis or opinion supporting Respondent's position, and all supporting documentation on which such party relies. U.S. EPA shall provide its Statement of Position, including supporting documentation, no later than 10 calendar days after receipt of the written notice of dispute. In the event that these 10-day time periods for exchange of written documents may cause a delay in the work, they shall be shortened upon, and in accordance with, notice by U.S. EPA. The time periods for exchange of written documents relating to disputes over billings for response costs may be extended at the sole discretion of U.S. EPA. An administrative record of any dispute under this Section shall be maintained by U.S. EPA. The record shall include the written notification of such dispute, and the Statement of Position served pursuant to the preceding Paragraph. Upon review of the administrative record, the Director of the Superfund Division, U.S. EPA Region 5, shall resolve the dispute consistent with the NCP and the terms of this Settlement Agreement.

43. Respondent's obligations under this Settlement Agreement shall not be tolled by submission of any objection for dispute resolution under this Section. Following resolution of the dispute, as provided by this Section, Respondent shall fulfill the requirement that was the subject of the dispute in accordance with the agreement reached or with U.S. EPA=s decision, whichever occurs.

XVII. FORCE MAJEURE

44. Respondent agrees to perform all requirements of this Settlement Agreement within the time limits established under this Settlement Agreement, unless the performance is delayed by a *force majeure*. For purposes of this Settlement Agreement, a *force majeure* is defined as any event arising from causes beyond the control of Respondent, or of any entity controlled by Respondent, including but not limited to its contractors and subcontractors, which delays or prevents performance of any obligation under this Settlement Agreement despite Respondent's best efforts to fulfill the obligation. *Force majeure* does not include financial inability to complete the Work or increased cost of performance.

45. If any event occurs or has occurred that may delay the performance of any obligation under this Settlement Agreement, whether or not caused by a *force majeure* event, Respondent shall notify U.S. EPA orally within 24 hours of when Respondent first knew that the event might cause a delay. Within 7 calendar days thereafter, Respondent shall provide to U.S. EPA in writing an explanation and description of the reasons for the delay; the anticipated duration of the delay; all actions taken or to be taken to prevent or minimize the delay; a schedule for implementation of any measures to be taken to prevent or mitigate the delay or the effect of the delay; Respondent's rationale for attributing such delay to a *force majeure* event if it intends to assert such a claim; and a statement as to whether, in the opinion of Respondent, such event may cause or contribute to an endangerment to public health, welfare or the environment. Failure to comply with the above requirements shall be grounds for U.S. EPA to deny Respondent an extension of time for performance. Respondent shall have the burden of demonstrating by a preponderance of the evidence that the event is a force majeure, that the delay is warranted under the circumstances, and that best efforts were exercised to avoid and mitigate the effects of the delay.

46. If U.S. EPA agrees that the delay or anticipated delay is attributable to a *force majeure* event, the time for performance of the obligations under this Settlement Agreement that are affected by the *force majeure* event will be extended by U.S. EPA for such time as is necessary to complete those obligations. An extension of the time for performance of the obligations affected by the *force majeure* event shall not, of itself, extend the time for performance of any other obligation. If U.S. EPA does not agree that the delay or anticipated delay has been or will be caused by a *force majeure* event, U.S. EPA will notify Respondent in writing of its decision. If U.S. EPA agrees that the delay is attributable to a *force majeure* event, U.S. EPA will notify Respondent in writing of the length of the extension, if any, for performance of the obligations affected by the *force majeure* event.

XVIII. STIPULATED PENALTIES

47. Respondent shall be liable to U.S. EPA for stipulated penalties in the amounts set forth in Paragraphs 48 and 49 for failure to comply with the requirements of this Settlement Agreement specified below, unless excused under Section XVII (Force Majeure). ACompliance@ by Respondent shall include completion of the activities under this Settlement Agreement or any work plan or other plan approved under this Settlement Agreement identified below in accordance with all applicable requirements of this Settlement Agreement within the

specified time schedules established by and approved under this Settlement Agreement.

48. Stipulated Penalty Amounts - Work.

a. The following stipulated penalties shall accrue per violation per day for any noncompliance identified in Paragraph 48(b) not excused under Section XVII (Force Majeure):

Penalty Per Violation Per Day	Period of Noncompliance
$2,000	1st through 14th day
$5,000	15th through 30th day
$10,000	31st day and beyond

b. Compliance Milestones
Designation of Respondent=s Contractor
Designation of Respondent=s Project Coordinator
Submission of Health and Safety Plan
Submission of Emergency Contingency Plan
Submission of QAPP
Submission of Work Plan(s)
Initiation of Work
Completion of Post-Removal Site Controls

49. Stipulated Penalty Amounts - Reports. The following stipulated penalties shall accrue per violation per day for failure to submit timely or adequate reports or other written documents pursuant to Paragraphs 17-22 unless excused under Section XVII (Force Majeure):

Penalty Per Violation Per Day	Period of Noncompliance
$500	1st through 14th day
$1,000	15th through 30th day
$5,000	31st day and beyond

50. All penalties shall begin to accrue on the day after the complete performance is due or the day a violation occurs, and shall continue to accrue through the final day of the correction of the noncompliance or completion of the activity. However, stipulated penalties shall not accrue: 1) with respect to a deficient submission under Section VIII (Work to be Performed), during the period, if any, beginning on the 31st day after U.S. EPA=s receipt of such submission until the date that U.S. EPA notifies Respondent of any deficiency; and 2) with respect to a decision by the Director of the Superfund Division, Region 5, under Paragraph 42 of Section XVI (Dispute Resolution), during the period, if any, beginning on the 21st day after U.S. EPA submits its written statement of position until the date that the Director of the Superfund Division issues a final decision regarding such dispute. Nothing herein shall prevent the simultaneous accrual of separate penalties for separate violations of this Settlement Agreement.

51. Following U.S. EPA=s determination that Respondent has failed to comply with a requirement of this Settlement Agreement, U.S. EPA may give Respondent written notification of the failure and describe the noncompliance. U.S. EPA may send Respondent a written demand for payment of the penalties. However, penalties shall accrue as provided in the preceding Paragraph regardless of whether U.S. EPA has notified Respondent of a violation.

52. All penalties accruing under this Section shall be due and payable to U.S. EPA within 30 days of Respondent's receipt from U.S. EPA of a written demand for payment of the penalties, unless Respondent invokes the dispute resolution procedures under Section XVI (Dispute Resolution). All payments to U.S. EPA under this Section shall be paid by certified or cashier=s check(s) made payable to AU.S. EPA Hazardous Substances Superfund,@ shall be mailed to U.S. Environmental Protection Agency, Region 5, Program Accounting & Analysis Section, P.O. Box 371531, Pittsburgh, Pennsylvania 15251-7531, shall indicate that the payment is for stipulated penalties, and shall reference the U.S. EPA Site/Spill ID Number B5FH, the U.S. EPA Docket Number, and the name and address of the party making payment. Copies of check(s) paid pursuant to this Section, and any accompanying transmittal letter(s), shall be sent to U.S. EPA as provided in Paragraph 38(b).

53. The payment of penalties shall not alter in any way Respondent's obligation to complete performance of the Work required under this Settlement Agreement.

54. Penalties shall continue to accrue during any dispute resolution period, but need not be paid until 20 days after the dispute is resolved by agreement or by receipt of U.S. EPA=s decision.

55. If Respondent fails to pay stipulated penalties when due, U.S. EPA may institute proceedings to collect the penalties, as well as Interest. Respondent shall pay Interest on the unpaid balance, which shall begin to accrue on the date of written demand made pursuant to Paragraph 51. Nothing in this Settlement Agreement shall be construed as prohibiting, altering, or in any way limiting the ability of U.S. EPA to seek any other remedies or sanctions available by virtue of Respondent's violation of this Settlement Agreement or of the statutes and regulations upon which it is based, including, but not limited to, penalties pursuant to Sections 106(b) and 122(*l*) of CERCLA, 42 U.S.C. '' 9606(b) and 9622(*l*), and punitive damages pursuant to Section 107(c)(3) of CERCLA, 42 U.S.C. ' 9607(c)(3). Provided, however, that U.S. EPA shall not seek civil penalties pursuant to Section 106(b) or 122(*l*) of CERCLA or punitive damages pursuant to Section 107(c)(3) of CERCLA for any violation for which a stipulated penalty is provided herein, except in the case of a willful violation of this Settlement Agreement. Should Respondent violate this Settlement Agreement or any portion hereof, U.S. EPA may carry out the required actions unilaterally, pursuant to Section 104 of CERCLA, 42 U.S.C. '9604, and/or may seek judicial enforcement of this Settlement Agreement pursuant to Section 106 of CERCLA, 42 U.S.C. '9606. Notwithstanding any other provision of this Section, U.S. EPA may, in its unreviewable discretion, waive in writing any portion of stipulated penalties that have accrued pursuant to this Settlement Agreement.

XIX. COVENANT NOT TO SUE BY U.S. EPA

56. In consideration of the actions that will be performed and the payments that will be made by Respondent under the terms of this Settlement Agreement, and except as otherwise specifically provided in this Settlement Agreement, U.S. EPA covenants not to sue or to take administrative action against Respondent pursuant to Sections 106 and 107(a) of CERCLA, 42 U.S.C. '' 9606 and 9607(a), for the Work and Response Costs. This covenant not to sue shall take effect upon the Effective Date and is conditioned upon the complete and satisfactory performance by Respondent of all obligations under this Settlement Agreement, including, but not limited to, payment of Response Costs pursuant to Section XV (Payment of Response Costs). This covenant not to sue extends only to Respondent and does not extend to any other person.

XX. RESERVATIONS OF RIGHTS BY U.S. EPA

57. Except as specifically provided in this Settlement Agreement, nothing herein shall limit the power and authority of U.S. EPA or the United States to take, direct, or order all actions necessary to protect public health, welfare, or the environment or to prevent, abate, or minimize an actual or threatened release of hazardous substances, pollutants or contaminants, or hazardous or solid waste on, at, or from the Site. Further, nothing herein shall prevent U.S. EPA from seeking legal or equitable relief to enforce the terms of this Settlement Agreement. U.S. EPA also reserves the right to take any other legal or equitable action as it deems appropriate and necessary, or to require the Respondent in the future to perform additional activities pursuant to CERCLA or any other applicable law.

58. The covenant not to sue set forth in Section XIX (Covenant Not to Sue by U.S. EPA) above does not pertain to any matters other than those expressly identified therein. U.S. EPA reserves, and this Settlement Agreement is without prejudice to, all rights against Respondent with respect to all other matters, including, but not limited to:

a. claims based on a failure by Respondent to meet a requirement of this Settlement Agreement;

b. liability for costs not included within the definition of Response Costs;

c. liability for performance of response action other than the Work;

d. criminal liability;

e. liability for damages for injury to, destruction of, or loss of natural resources, and for the costs of any natural resource damage assessments;

f. liability arising from the past, present, or future disposal, release or threat of release of Waste Materials outside of the Site; and

g. liability for costs incurred or to be incurred by the Agency for Toxic Substances and Disease Registry related to the Site.

XXI. COVENANT NOT TO SUE BY RESPONDENT

59. Respondent covenants not to sue and agrees not to assert any claims or causes of action against the United States, or its contractors or employees, with respect to the Work, Response Costs, or this Settlement Agreement, including, but not limited to:

a. any direct or indirect claim for reimbursement from the Hazardous Substance Superfund established by 26 U.S.C. ' 9507, based on Sections 106(b)(2), 107, 111, 112, or 113 of CERCLA, 42 U.S.C. '' 9606(b)(2), 9607, 9611, 9612, or 9613, or any other provision of law;

b. any claim arising out of response actions at or in connection with the Site, including any claim under the United States Constitution, the Ohio Constitution, the Tucker Act, 28 U.S.C. ' 1491, the Equal Access to Justice Act, 28 U.S.C. ' 2412, as amended, or at common law; or

c. any claim against the United States pursuant to Sections 107 and 113 of CERCLA, 42 U.S.C. '' 9607 and 9613, relating to the Site.

These covenants not to sue shall not apply in the event the United States brings a cause of action or issues an order pursuant to the reservations set forth in Paragraphs 58 (b), (c), and (e) - (g), but only to the extent that Respondent's claims arise from the same response action, response costs, or damages that the United States is seeking pursuant to the applicable reservation.

60. Nothing in this Agreement shall be deemed to constitute approval or preauthorization of a claim within the meaning of Section 111 of CERCLA, 42 U.S.C. ' 9611, or 40 C.F.R. ' 300.700(d).

XXII. OTHER CLAIMS

61. By issuance of this Settlement Agreement, the United States and U.S. EPA assume no liability for injuries or damages to persons or property resulting from any acts or omissions of Respondent. The United States or U.S. EPA shall not be deemed a party to any contract entered into by Respondent or its directors, officers, employees, agents, successors, representatives, assigns, contractors, or consultants in carrying out actions pursuant to this Settlement Agreement.

62. Except as expressly provided in Section XXI (Covenant Not to Sue by Respondent), and Section XX (Covenant Not to Sue by U.S. EPA), nothing in this Settlement Agreement constitutes a satisfaction of or release from any claim or cause of action against Respondent or any person not a party to this Settlement Agreement, for any liability such person may have under CERCLA, other statutes, or common law, including but not limited to any claims of the

United States for costs, damages and interest under Sections 106 and 107 of CERCLA, 42 U.S.C. '' 9606 and 9607.

63. No action or decision by U.S. EPA pursuant to this Settlement Agreement shall give rise to any right to judicial review, except as set forth in Section 113(h) of CERCLA, 42 U.S.C. ' 9613(h).

XXIII. CONTRIBUTION

64. a. The Parties agree that this Settlement Agreement constitutes an administrative settlement for purposes of Section 113(f)(2) of CERCLA, 42 U.S.C. ' 9613(f)(2), and that Respondent is entitled, as of the Effective Date, to protection from contribution actions or claims as provided by Sections 113(f)(2) and 122(h)(4) of CERCLA, 42 U.S.C. '' 9613(f)(2) and 9622(h)(4), for Amatters addressed@ in this Settlement Agreement. The Amatters addressed@ in this Settlement Agreement are the Work and Response Costs.

b. The Parties agree that this Settlement Agreement constitutes an administrative settlement for purposes of Section 113(f)(3)(B) of CERCLA, 42. U.S.C. ' 9613(f)(3)(B), pursuant to which the Respondent has, as of the Effective Date, resolved its liability to the United States for the Work and Response Costs.

c. Except as provided in Section XXI(Covenant Not To Sue By Respondent), nothing in this Settlement Agreement precludes the United States or Respondent from asserting any claims, causes of action, or demands for indemnification, contribution, or cost recovery against any persons not parties to this Settlement Agreement. Nothing herein diminishes the right of the United States, pursuant to Section 113(f)(2)and (3), 42 U.S.C. ' 9613(f)(2) and (3), to pursue any such persons to obtain additional response costs or response action, and to enter into settlements that give rise to contribution protection pursuant to Section 113(f)(2) of CERCLA, 42 U.S.C. ' 9613(f)(2).

XXIV. INDEMNIFICATION

65. Respondent shall indemnify, save and hold harmless the United States, its officials, agents, contractors, subcontractors, employees and representatives from any and all claims or causes of action arising from, or on account of, negligent or other wrongful acts or omissions of Respondent, its officers, directors, employees, agents, contractors, or subcontractors, in carrying out actions pursuant to this Settlement Agreement. In addition, Respondent agrees to pay the United States all costs incurred by the United States not inconsistent with the National Contingency Plan**,** including but not limited to attorneys fees and other expenses of litigation and settlement, arising from or on account of claims made against the United States based on negligent or other wrongful acts or omissions of Respondent, its officers, directors, employees,

agents, contractors, subcontractors and any persons acting on their behalf or under their control, in carrying out activities pursuant to this Settlement Agreement. The United States shall not be held out as a party to any contract entered into by or on behalf of Respondent in carrying out activities pursuant to this Settlement Agreement. Neither Respondent nor any such contractor shall be considered an agent of the United States. The Federal Tort Claims Act (28 U.S.C. ' ' 2671, 2680) provides coverage for injury or loss of property, or injury or death caused by the negligent or wrongful act or omission of an employee of U.S. EPA while acting within the scope of his or her employment, under circumstances where U.S. EPA, if a private person, would be liable to the claimant in accordance with the law of the place where the act or omission occurred.

66. The United States shall give Respondent notice of any claim for which the United States plans to seek indemnification pursuant to this Section and shall consult with Respondent prior to settling such claim.

67. Respondent waives all claims against the United States for damages or reimbursement or for set-off of any payments made or to be made to the United States, arising from or on account of any contract, agreement, or arrangement between Respondent and any person for performance of Work on or relating to the Site, including, but not limited to, claims on account of construction delays. In addition, Respondent shall indemnify and hold harmless the United States with respect to any and all claims for damages or reimbursement arising from or on account of any contract, agreement, or arrangement between Respondent and any person for performance of Work on or relating to the Site, including, but not limited to, claims on account of construction delays.

XXV. MODIFICATIONS

68. The OSC may make modifications to any plan or schedule in writing or by oral direction not inconsistent with the National Contingency Plan. Any oral modification will be memorialized in writing by U.S. EPA promptly, but shall have as its effective date the date that the OSC communicates his/her direction to Respondent. Any other requirements of this Settlement Agreement may be modified in writing by mutual agreement of the parties.

69. If Respondent seeks permission to deviate from any approved work plan or schedule, Respondent's Project Coordinator shall submit a written request to U.S. EPA for approval outlining the proposed modification and its basis. Respondent may not proceed with the requested deviation until receiving oral or written approval from the OSC pursuant to Paragraph 68.

70. No informal advice, guidance, suggestion, or comment by the OSC or other U.S. EPA representatives regarding reports, plans, specifications, schedules, or any other writing submitted by Respondent shall relieve Respondent of its obligation to obtain any formal approval required by this Settlement Agreement, or to comply with all requirements of this Settlement Agreement, unless it is formally modified.

XXVI. NOTICE OF COMPLETION OF WORK

71. When U.S. EPA determines, after U.S. EPA=s review of the Final Report, that all Work has been fully performed in accordance with this Settlement Agreement, with the exception of any continuing obligations required by this Settlement Agreement, including, *e.g.*, post-removal site controls, payment of Response Costs, and record retention, U.S. EPA will provide written notice to Respondent. If U.S. EPA determines that any such Work has not been completed in accordance with this Settlement Agreement, U.S. EPA will notify Respondent, provide a list of the deficiencies, and require that Respondent modify the Work Plan if appropriate in order to correct such deficiencies. Respondent shall implement the modified and approved Work Plan and shall submit a modified Final Report in accordance with the U.S. EPA notice. Failure by Respondent to implement the approved modified Work Plan shall be a violation of this Settlement Agreement.

XXVII. FINANCIAL ASSURANCE

72. Within 30 days of the Effective Date, Respondent shall establish and maintain financial security in the amount of $ 450,000 in one or more of the following forms:

a. A surety bond guaranteeing performance of the Work;

b. One or more irrevocable letters of credit equaling the total estimated cost of the Work;

c. A trust fund;

d. A guarantee to perform the Work by one or more parent corporations or subsidiaries, or by one or more unrelated corporations that have a substantial business relationship with Respondent; or

e. A demonstration that Respondent satisfies the requirements of 40 C.F.R. Part 264.143(f). {NOTE: For these purposes, references in 40 C.F.R. ' 264.143(f) to the Asum of current closure and post-closure costs estimates and the current plugging and abandonment costs estimates@ shall mean the amount of financial security specified above. If any Respondent who seeks to provide a demonstration under 40 C.F.R. ' 264.143(f) has provided a similar demonstration at other RCRA or CERCLA sites, the amount for which they are providing financial assurance at those other sites should generally be added to the estimated costs of the Work for this Paragraph.}

73. If Respondent seeks to demonstrate the ability to complete the Work through a guarantee by a third party pursuant to Paragraph 72(a) of this Section, Respondent shall demonstrate that the guarantor satisfies the requirements of 40 C.F.R. § 264.143(f). If Respondent seeks to demonstrate its ability to complete the Work by means of the financial test or the corporate guarantee pursuant to Paragraph 72(d) or (e) of this Section, it shall resubmit sworn statements conveying the information required by 40 C.F.R. § 264.143(f) annually, on the anniversary of the Effective Date. In the event that U.S. EPA determines at any time that the

financial assurances provided pursuant to this Section are inadequate, Respondent shall, within 30 days of receipt of written notice of U.S. EPA=s determination, obtain and present to U.S. EPA for approval one of the other forms of financial assurance listed in Paragraph 72 of this Section. Respondent's inability to demonstrate financial ability to complete the Work shall not excuse performance of any activities required under this Settlement Agreement.

74. If, after the Effective Date, Respondent can show that the estimated cost to complete the remaining Work has diminished below the amount set forth in Paragraph 72 of this Section, Respondent may, on any anniversary date of the Effective Date, or at any other time agreed to by the Parties, reduce the amount of the financial security provided under this Section to the estimated cost of the remaining Work to be performed. Respondent shall submit a proposal for such reduction to U.S. EPA, in accordance with the requirements of this Section, and may reduce the amount of the security upon approval by U.S. EPA. In the event of a dispute, Respondent may reduce the amount of the security in accordance with the written decision resolving the dispute.

75. Respondent may change the form of financial assurance provided under this Section at any time, upon notice to and approval by U.S. EPA, provided that the new form of assurance meets the requirements of this Section. In the event of a dispute, Respondent may change the form of the financial assurance only in accordance with the written decision resolving the dispute.

XXVIII. <u>INSURANCE</u>

76. At least 7 days prior to commencing any on-Site work under this Settlement Agreement, Respondent shall secure, and shall maintain for the duration of this Settlement Agreement, comprehensive general liability insurance and automobile insurance with limits of ten million dollars, combined single limit. Within the same time period, Respondent shall provide U.S. EPA with certificates of such insurance and a copy of each insurance policy. In lieu of securing the specified insurance, Respondent may demonstrate that it is self-insured and has assets sufficient to address any liability for which such insurance was required. If Respondent elects to make such a demonstration then, each year within 90 days after the end of Respondent's fiscal year, Respondent shall submit to the United States (a) its annual financial statements (audited in accordance with U.S. Generally Accepted Accounting Principles) demonstrating that Respondent has 1) a net worth of not less than U.S. $2,000,000,000; 2) working capital of not less than U.S. $1,000,000,000; and 3) a debt to equity ratio of not more than 4.0; and (b) a letter signed by Respondent's chief financial officer (or other responsible corporate financial officer) confirming that Respondent satisfies the criteria set forth in items (1) through (3) above for its most recent completed fiscal year. If at any time after electing to make the demonstration set forth in the immediately preceding sentence Respondent fails to satisfy the criteria set forth in items (1) through (3) above, Respondent shall immediately notify EPA of such failure and shall promptly (and in any event within 90 days) secure the specified third-party insurance. In addition, for the duration of the Settlement Agreement, Respondent shall satisfy, or shall ensure that its contractors or subcontractors satisfy, all applicable laws and regulations regarding the provision of worker=s compensation insurance for all persons performing the

Work on behalf of Respondent in furtherance of this Settlement Agreement. If Respondent demonstrates by evidence satisfactory to U.S. EPA that any contractor or subcontractor maintains insurance equivalent to that described above, or insurance covering some or all of the same risks but in an equal or lesser amount, then Respondent need provide only that portion of the insurance described above which is not maintained by such contractor or subcontractor or demonstrate sufficient financial assets under the self-insurance program, as discussed above.

XXIX. SEVERABILITY/INTEGRATION/ATTACHMENTS

77. If a court issues an order that invalidates any provision of this Settlement Agreement or finds that Respondent has sufficient cause not to comply with one or more provisions of this Settlement Agreement, Respondent shall remain bound to comply with all provisions of this Settlement Agreement not invalidated or determined to be subject to a sufficient cause defense by the court=s order.

78. This Settlement Agreement and its attachments constitute the final, complete and exclusive agreement and understanding among the Parties with respect to the settlement embodied in this Settlement Agreement. The Parties acknowledge that there are no representations, agreements or understandings relating to the settlement other than those expressly contained in this Settlement Agreement. The following attachments are incorporated into this Settlement Agreement: Attachment A (Map of Site).

XXX. EFFECTIVE DATE

79. This Settlement Agreement shall be effective upon receipt by Respondent of a copy of this Settlement Agreement signed by the Director, Superfund Division, U.S. EPA Region 5.

The undersigned representative of Respondent certifies that he/she is fully authorized to enter into the terms and conditions of this Settlement Agreement and to bind the party they represent to this document.

Agreed this ____ day of ___________, 2006.

For Respondent

By

Title ______________________________

IN THE MATTER OF:

BEHR VOC PLUME SITE
DAYTON, OHIO

It is so ORDERED and Agreed this _______ day of _____________, 2006.

BY: ________________________________
Richard C. Karl, Director
Superfund Division
United States Environmental Protection Agency
Region 5

REMOVAL PROGRAM
106 CONSENT ORDER
ROUTING SLIP
(REVISED JUNE 2006)

Behr VOC Plume Site
(SITE NAME)

(Initial 106 Consent Order U.S. EPA transmittal to PRPs for signature.
Use when ERB Branch Chief signs cover letter.)

Please sign the Yellow and check your name off this page.
Then pass the document on to the next name.
Do not sign this page, SIGN THE YELLOW

	NAME	MAIL CODE
1. ERB ENFORCEMENT SPECIALIST	Carol Ropski	SE-5J
2. ERB ON-SCENE COORDINATOR	Steve Renninger	G-41
3. EESS SECRETARY	Akimi Cheng	SE-5J
4. ORC STAFF ATTORNEY	Maria Gonzalez	C-14J
5. ORC SECTION CHIEF	Sandra Lee	C-14J
6. EESS SECRETARY	Akimi Cheng	SE-5J
7. ERB RESPONSE SECTION CHIEF I	Jason El-Zein	SE-5J
8. EESS ACTING SECTION CHIEF	Ross Del Rosario	SE-5J
9. ERB 1 ACTING BRANCH SECRETARY	Mary Jane Adomo	SE-5J
10. ERB #2 BRANCH CHIEF	William Bolen	SE-5J
11. EESS SECRETARY FOR MAILING TO PRPS AND DISTRIBUTION OF BCC LIST	Akimi Cheng	SE-5J

DATE MAILED TO PRP's: ____________________
DATE SIGNED COPIES RETURNED FROM PRP'S

(Signed copies should be returned to the ERB for final routing; this sheet will be maintained in ERB until receipt of the signed copies from the PRPs.)

Behr VOC Plume Site

FEDERAL EXPRESS

Shawn R. DeMerse, JD, CHMM
Environmental Counsel
Office Of The General Counsel
DaimlerChrysler Corporation
CIMS 485-13-62
1000 Chrysler Drive
Auburn Hills, MI 48326-2766

Re: Behr VOC Plume Site
Dayton, Montgomery County, Ohio

Dear Mr. DeMerse:

Enclosed please find two copies of an Administrative Settlement Agreement and Order by Consent prepared by the U.S. Environmental Protection Agency ("U.S. EPA") under Section 106 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. '9606. Please return both executed copies of the consent order within 5 calendar days after receipt of this letter to Maria Gonzalez, Associate Regional Counsel, C-14J, 77 West Jackson Boulevard, Chicago, Illinois 60604. Your failure to return two executed copies of the consent order to U.S. EPA within that time period will be construed as an unwillingness to enter a consent order with U.S. EPA. U.S. EPA will then proceed accordingly.

If you have any questions regarding the Order, feel free to contact Maria Gonzalez Associate Regional Counsel, at (312) 886-6630 or Steve Renninger, On-Scene Coordinator, at (513) 569-7539.

Sincerely yours,

William Bolen, Chief
Emergency Response Branch #1

Enclosures

cc: Jon S. Faletto
Hinshaw & Colbertson LLP

Ms. Cindy Hafner, Chief Dvision of Emergency & Remedial Response
Ohio Environmental Protection Agency

bcc: Docket Analyst, ORC (C-14J)
Maria Gonzalez, ORC (C-14J)
Steve Renninger (SE-5J)
John Maritote, EESS (SE-5J)
Carol Ropski, EESS (SE-5J)
Betty White, PAAS (MF-10J)
Records Center (SMR-7J)
Denise Gawlinski, Public Affairs (P-19J) w/out attachments
Michael T. Chezik, Department of Interior
OSRE (only if costs are compromised) (2272A)

Attachment B

Health and Safety Plan

Attachment C

Quality Assurance Project Plan

Attachment D

Resident Contact List

Non-Responsive

[redacted]

Non-Responsive

[redacted]

Non-Responsive

[redacted]

Attachment E

Canister Data Form

FORM A-1
CANISTER DATA FORM

I. GENERAL INFORMATION

Company Name: ____________________
Canister ID No.:_______________________

Company Contact: ___________________
Sampler ID No.: _______________________

Company Address: ___________________
Vacuum Controller ID No.: _____________

____
Flow Controller ID No.: ________________

Telephone No.: ______________________
Canister Leak Check Date: _____________

Facsimile No.: _______________________
Shipping Date: ________________________

II. SAMPLING INFORMATION

Sampling Date: ____

Sampling Address: ____

Location of Canister is Place: ____

Use of Room Where Canister is Place: ____

Room Furnishings: ____

Materials Stored in Room: ____

Weather Conditions During Test: ____

TEMPERATURE:
BAROMETRIC PRESSURE

INTERIOR AMBIENT MAXIMUM MINIMUM

START ____

STOP ____

Canister VACUUM on OPENING Valve: ______________________________

DATE Canister Valve OPENED: __________ TIME Canister Valve OPENED: _________

DATE Canister Valve CLOSED: __________ TIME Canister Valve CLOSED: _________

_________________ __________
Signature Date

Attachment F

Household Information Form

FORM A-2
HOUSEHOLD INFORMATION FORM

Date: ___________ Time: ___________ Inspector: _______________

Pictures Allowed: ☐ Yes ☐ No

Sample No. ____________

Address: ____

Contact Name: ____

Years at this Address: ____

HOUSE TYPE: One story: ______ Multi-story _____ Brick _____ Siding ______ Stucco _____

WEATHER SEALS: General Condition: Good _____ Fair _____ Poor ______

BASEMENT:	None	☐	Finished	Unfinished	Depth below grade
	Partial	☐	☐	☐	________________
	Full	☐	☐	☐	________________
	Crawl space	☐	na	na	________________

Foundation construction: Poured concrete ☐ Cinder block ☐

Condition at floor/wall joint (if visible) ____

Floor drains, sump ____

Vents, fans, windows ____

Floor condition (type, cracks, drains) ____

Wall openings, utility pipe penetrations ____

Moisture Condition (dry, damp, wet) ____

FURNACE: Location: ____

Type:

gas	☐	Forced air	☐
oil	☐	hot water	☐
electric	☐	other _________________________________	

Blower capacity (if applicable) ____

Does furnace have outside combustion air vent? ______________________

Winter temperature setting: day ____________ night _________________

AIR CONDITIONER: None _____ Central _____ (if yes, capacity?) _____ Room ______

(If yes, which rooms and capacities? ____

RADON SYSTEM: Yes ____ No ____ If yes, floor scaled? _____________________________

Floor drain/sump vent? ____
Other ventilation? ____

Pictures Taken:

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

12.

13.

14.

15.

16.

17.

18.

19.

20.

Attachment G

Resident Questionnaire

FORM A-3
RESIDENT QUESTIONNAIRE

DaimlerChrysler, in cooperation with the U.S. Environmental Protection Agency, will collect indoor air samples from residences in an area near the Behr Dayton Thermal Systems Plant, Dayton, OH. These samples will be analyzed to detect volatile organic compounds (VOC) vapors inside the residences.

VOCs are found in outside air and in the air inside of buildings. VOCs can be found in solvents and other household items, such as pesticides, insecticides, adhesives, aerosols, paints, coatings, dry cleaning, carpet and drapery cleaning fluids, and household spot removers. Other common VOC sources include telephone and computer cables, plastic items, vinyl cove molding, PVC plumbing, linoleum, concrete blocks, latex paint, carpet padding, foam rubber, lubricants, and cosmetics.

Your answer to the following questions will help us determine if sources of VOCs exist in your home. Please answer each question to the best of your knowledge.

1. When was the last time dry-cleaned clothes were brought into the house?

   ☐ 0 to 5 days ago ☐ 6 to 10 days ago ☐ More than 10 days ago

2. When was your carpet installed?

   ☐ In the last six months ☐ More than six months ago

3. When was the last time your carpet was cleaned?

   ☐ In the last six months ☐ More than six months ago

4. Do you have any spot removers in the house?

   ☐ Yes ☐ No

5. Do your hobbies include model buildings, arts and crafts, model railroading metal cleaning, or others that require paints, thinners, solvents, or glue?

   ☐ Yes ☐ No

6. Do you perform automotive or other vehicle maintenance or repair at home?

   ☐ Yes ☐ No

7. Please review the following list and check items you know are in your home.

   ☐ Latex caulk

   ☐ Latex paint

   ☐ Vinyl cove molding

   ☐ Linoleum tile

   ☐ Large diameter telephone cable

   ☐ Small diameter telephone cable

   ☐ Black rubber molding

   ☐ Vinyl edge molding

- ☐ Polystyrene foam insulation
- ☐ Cement block
- ☐ Treated metal roofing

8. Do you have pesticides in your home?

☐ Yes ☐ No ☐ Unsure

9. Do you have any spray insecticides in your home?

☐ Yes ☐ No ☐ Unsure

10. Have you painted the interior of your home in the last 12 months?

☐ Yes ☐ No

11. Have you painted the exterior of your home in the last 12 months?

☐ Yes ☐ No

12. If you have answered yes to questions 10 or 11, please indicate what paint you used.

- ☐ Enamel
- ☐ Vinyl
- ☐ Latex
- ☐ Other

13. Where do you store your paint, thinner, pesticides, insecticides?

- ☐ Garage
- ☐ Basement
- ☐ Storage shed
- ☐ Other
- ☐ I don't store these items at home.

____

14. Do you have pets?

☐ Yes ☐ No

If yes, what type? ____ If yes, number ____

Attachment H

Indoor Air Testing Resident Instructions

FORM A-4

INDOOR AIR TESTING RESIDENT INSTRUCTIONS

1. The duration of this test is approximately 24 hours.
2. The canister is made of clean stainless steel. It does not contain any moving parts or chemicals.
3. Please do not handle or move a canister during testing.
4. Please do not smoke around the canister.
5. To the extent possible, leave doors and windows closed during testing.
6. To the extent possible, do not use paint, solvents, glues and spray cans during testing.
7. If possible, do not bring dry cleaning home during the testing.
8. We will be back at the end of the day to pick up the canister about this time.

Canister pick up:

Day ______________________________________

Time _____________________________________

Thank you for your cooperation.

Attachment I

REAC SOP #2082

STANDARD OPERATING PROCEDURES

CONSTRUCTION AND INSTALLATION OF PERMANENT SUB-SLAB SOIL GAS WELLS

CONTENTS

1.0 SCOPE AND APPLICATION

Soil gas monitoring provides a quick means of detecting volatile organic compounds (VOCs) in the soil subsurface. Using this method, underground VOC contamination can be identified, and the source, extent, and movement of pollutants can be traced.

This standard operating procedure (SOP) outlines the methods used for the construction and installation of permanent sub-slab soil gas wells. The wells are utilized to sample the gas contained in the interstitial spaces beneath the concrete floor slab of dwellings and other structures. The thickness of a concrete slab may vary from structure to structure. A structure may have a single slab where the thickness varies. The type of equipment described in this standard operating procedure (SOP) may be purchased at a local home center or hardware store and should allow the installation of a soil gas well in a slab up to 8-inches thick. Equipment can be purchased to drill thru a slab of greater thickness, however this equipment may not be available locally.
These are standard (i.e., typically applicable) operating procedures which may be varied or changed as required, dependent on site conditions, equipment limitations or limitations imposed by the procedure. In all instances, the ultimate procedures employed should be documented and associated with the final report.

Mention of trade names or commercial products does not constitute United States Environmental Protection Agency (U.S. EPA) endorsement or recommendation for use.

2.0 METHOD SUMMARY

Using an electric Hammer Drill or Rotary Hammer, an inner or pilot hole is drilled into the concrete slab to a depth of approximately 2 inches (“) with the 3/8" diameter drill bit. Using the pilot hole as the center, drill an outer hole to an approximate depth of 1 3/8" using the 1" diameter drill bit. Replacing the 3/8" diameter drill bit continue to drill the pilot hole thru the slab and several inches into the sub-slab material. Once drilling is completed, a stainless steel probe is assembled and inserted into the pre-drilled hole. The probe is mounted flush with the surrounding slab so it will not interfere with pedestrian or vehicular traffic and cemented into place. A length of Teflon® tubing is attached to the probe assembly and to a sample container or system. Sample collection may now begin.

3.0 EQUIPMENT/APPARATUS

Hammer Drill or Rotary Hammer
AC extension cord
AC generator (if AC power is not available on site)
Hammer or Rotary Hammer drill bit, 3/8"diameter
Hammer or Rotary Hammer drill bit, 1"diameter
Portable vacuum cleaner
(1) 3/4" open end wrench or (1) medium adjustable wrench
(2) 9/16" open end wrenches or (2) small adjustable wrenches
Hex head wrench, 1/4"
Tubing cutter
Bucket

Trowel or putty knife
Swagelok® SS-400-7-4 Female Connector, 1/4"NPT to 1/4" Swagelok® connector
Swagelok® SS-400-1-4 Male Connector, 1/4"NPT to 1/4" Swagelok® connector
1/4"NPT flush mount hex socket plug, Teflon® coated
1/4"OD stainless steel tubing, pre-cleaned instrument grade
1/4"OD Teflon® tubing
Teflon® thread tape
Anchoring cement (requires water for mixing)
Modeling clay

4.0 PROCEDURE FOR PROBE ASSEMBLY AND INSTALLATION

- Drill a 3/8"diameter inner, or pilot hole to a depth of 2". (Figure 1)

- Using the 3/8" pilot hole as your center, drill a 1" diameter outer hole to a depth of 1 3/8". (Figure 2)

- Vacuum out any cuttings from the hole.

- Continue drilling the 3/8" inner, or pilot hole thru the slab and a few inches into the sub-slab material. (Figure 3)

- Figure 4 details installed probe assembly.

- Vacuum out any cuttings from the outer hole.

- Determine the length of stainless steel tubing required to reach from the bottom of the outer hole, thru the slab, and into the open cavity below the slab. To avoid obstruction of the probe tube, insure that it does not contact the sub-slab material. Cut the tubing to the desired length.

- Attach the measured length of 1/4"OD stainless tubing to the female connector with the Swagelok® nut. Tighten the nut.

- Insert the 1/4" hex socket plug into the female connector. Tighten the plug. **Do not over tighten**. If excessive force is required to remove the plug during the sample set up phase the probe may break loose from the anchoring cement.

- Place the completed probe into the outer hole. The probe tubing should not contact the sub-slab material and the top of the female connector should be flush with the surface of the slab and centered in the outer hole.

- Mix a small amount of the anchoring cement. Fill the space between the probe and the outside of the outer hole. Allow the cement to cure according to manufacturers instructions before sampling.

5.0 PROCEDURE FOR SAMPLING SETUP

Complete the sampling setup (Figure 5) as follows:

- Wrap one layer of Teflon® thread tape onto the NPT end of the male connector.

- Remove the 1/4" hex socket plug from the female connector. Refer to Section 6.0 if the probe breaks loose from the anchoring cement during this step.

- Screw and tighten the male connector into the female connector. **Do not over tighten**. This may cause the probe to break loose from the anchoring cement during this step or when the male connector is removed upon completion of the sampling event. Refer to Section 6.0 if the probe breaks loose from the anchoring cement during this step.

- Attach a length of 1/4"OD Teflon® tubing to the male connector with a Swagelok® nut. The Teflon® tubing is then connected to the sampling container or system to be utilized for sample collection.

- After sample collection remove the male connector from the probe and reinstall the hex socket plug. **Do not over tighten** the hex socket plug. If excessive force is required to remove the plug during the next sampling event the probe may break loose from the anchoring cement .Refer to Section 6.0 if the probe breaks loose from the anchoring cement during this step.

6.0 PROCEDURE FOR REPAIRING A LOOSE PROBE

- If the probe breaks loose from the anchoring cement while removing or installing the hex head plug, or the male connector, lift the probe slightly above the surface of the concrete slab.

- Hold the female connector with the 3/4"open end wrench.

- Complete the step being taken during which the probe broke loose, following the instructions contained in the standard operating procedure (SOP). (i.e. **Do not over tighten** the hex socket plug or male connector)

- Push the probe back down into place and reapply the anchoring cement.

- Modeling clay may be used as a temporary patch to affect a seal around the probe until the anchoring cement can be reapplied.

Attachment J

Air Sampling Field Form

Air Sampling Field Form

Location	Sample Name	Sample Type	Cannister	Controller	Purge Time (MMDDHHMM)	Sample Time Start (MMDDHHMM)	Sample Time End (MMDDHHMM)	Leak Check	Initial Pressures ('Hg)	Final Pressures ("Hg)

Sampler Name: ______________________________

Date: ______________________________

Sample Methodolgy: ______________________________

Sample Analytical Method: ______________________________

Project Number: ______________________________

Project Name: ______________________________

Comments: ______________________________

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____

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____

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EarthTech
A tyco International Ltd. Company

Attachment K

Property Access and Activity Agreement

<u>Property Access and Activity Agreement</u>

This Agreement is made on ____________,2007 between _________________, whose mailing address is ____ and ___________________________________ (tenant if applicable) address is ___________________, Dayton Ohio 45404, hereinafter collectively referred to as "Owner/Tenant" and DaimlerChrysler Corporation ("DCC") whose mailing address is DaimlerChrysler Corporation, c/o Mr. Greg Rose, CIMS 482-00-51, 800 Chrysler Drive, Auburn Hills, Michigan 48326.

1. Owner/Tenant grants access to DCC, its agents, representatives, employees, contractors, subcontractors and DCC's invitees to the property located at _____________________ Dayton, Ohio 45404 ("Property") at reasonable times and upon reasonable advance notice for the purpose of:
   a. Inspecting, investigating, documenting and photographing the property and collecting air, soil, groundwater and other samples as necessary for environmental and/or geotechnical testing in accordance with all applicable laws, rules and/or regulations governing same; and
   b. Installing, operating, maintaining and removing as necessary, environmental testing, recovery and treatment systems at the Property.

2. For purposes of providing notice under this Agreement, the contact person for the Owner/Tenant is ___________________, phone number _____________. The contact person for DCC is Mr. Greg Rose, CIMS 482-00-51, 800 Chrysler Drive, Auburn Hills, Michigan 48326, phone number (248) 576-7362, fax number (248) 576-7369.

3. DCC shall provide Owner/Tenants with a plan outlining the installation of any and all environmental testing, recovery and treatment systems.

4. Ownership of any environmental testing, recovery and treatment system shall vest with the Owner of the Property upon installation. DCC shall not retain any ownership rights of the environmental testing, recovery and treatment system.

5. Prior to installing any environmental testing, recovery and treatment system, DCC shall notify and obtain all necessary approvals from public agencies.

6. All work by DCC or its employees, contractors or subcontractors pursuant to this Agreement shall be conducted in such a manner as to minimize any disruption of or interference Owner/Tenant. No work shall be undertaken which will materially damage buildings, improvements, equipment, or personal property on the Property without Owner/Tenants' prior approval.

7. Owner/Tenants agree that they will not take, or cause to be taken, any action which would interfere or adversely affect the equipment or activities on the Property pursuant to this Agreement.

8. DCC agrees to repair or otherwise correct any property damage caused by the activities of DCC, its employees, contractors or subcontractors on the Property.

9. DCC's contractors and subcontractors working on the Property shall have liability insurance, including comprehensive general liability insurance, of at least $2 Million per occurrence and will provide adequate proof of such insurance upon request.

10. DCC, by entering into this Agreement, assumes no obligation to the Owner/Tenant(s) to implement and/or continue the activities described in this Agreement.

11. DCC shall provide $150 to Owner/Tenant for electrical charges incurred as a result of the operation of the environmental testing, recovery and treatment system for the period of December 1, 2006 through December 1, 2008. On or before December 1, 2008, DCC and Owner/Tenants shall re-evaluate electrical charges and reasonably adjust future payments by DCC for same.

12. Except as expressly provided in this Agreement, neither party by entering into this Agreement waives any right it may have against the other party, or any other person or entity relating to the release or threatened release of hazardous or regulated substances under all applicable federal, state and/or local laws, rules or regulations.

13. This Agreement is governed by Michigan Law.

14. This Agreement shall be effective on the first date it is fully executed and expires at midnight on December 1, 2018, or whenever the environmental testing, recovery and treatment system is no longer required as dictated by U.S. EPA, whichever occurs first.

15. If this Agreement is executed in duplicate, both are deemed originals.

OWNER/TENANT

By: ______________________________

Its: ______________________________

DaimlerChrysler Corporation

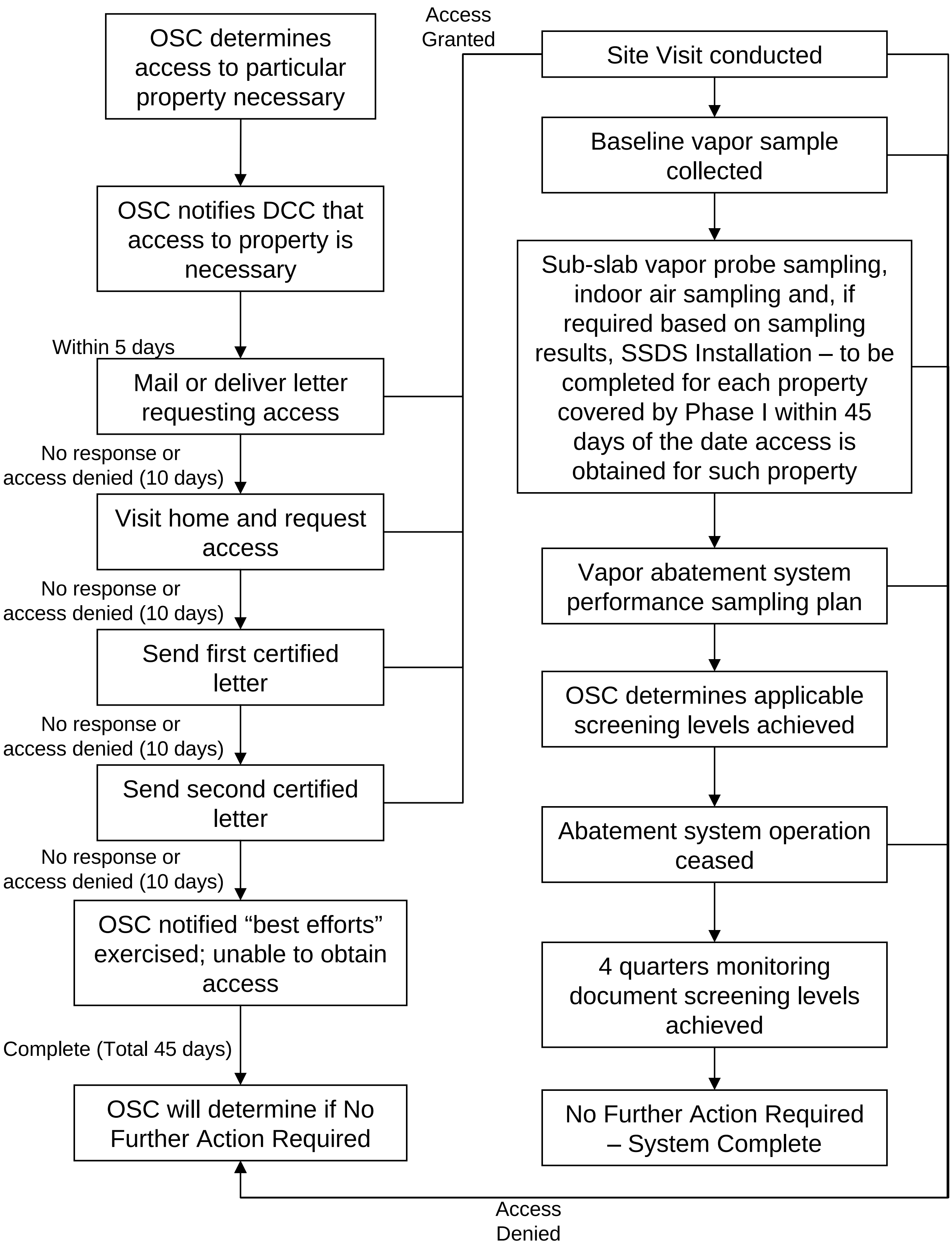
By: ______________________________

Its: ______________________________

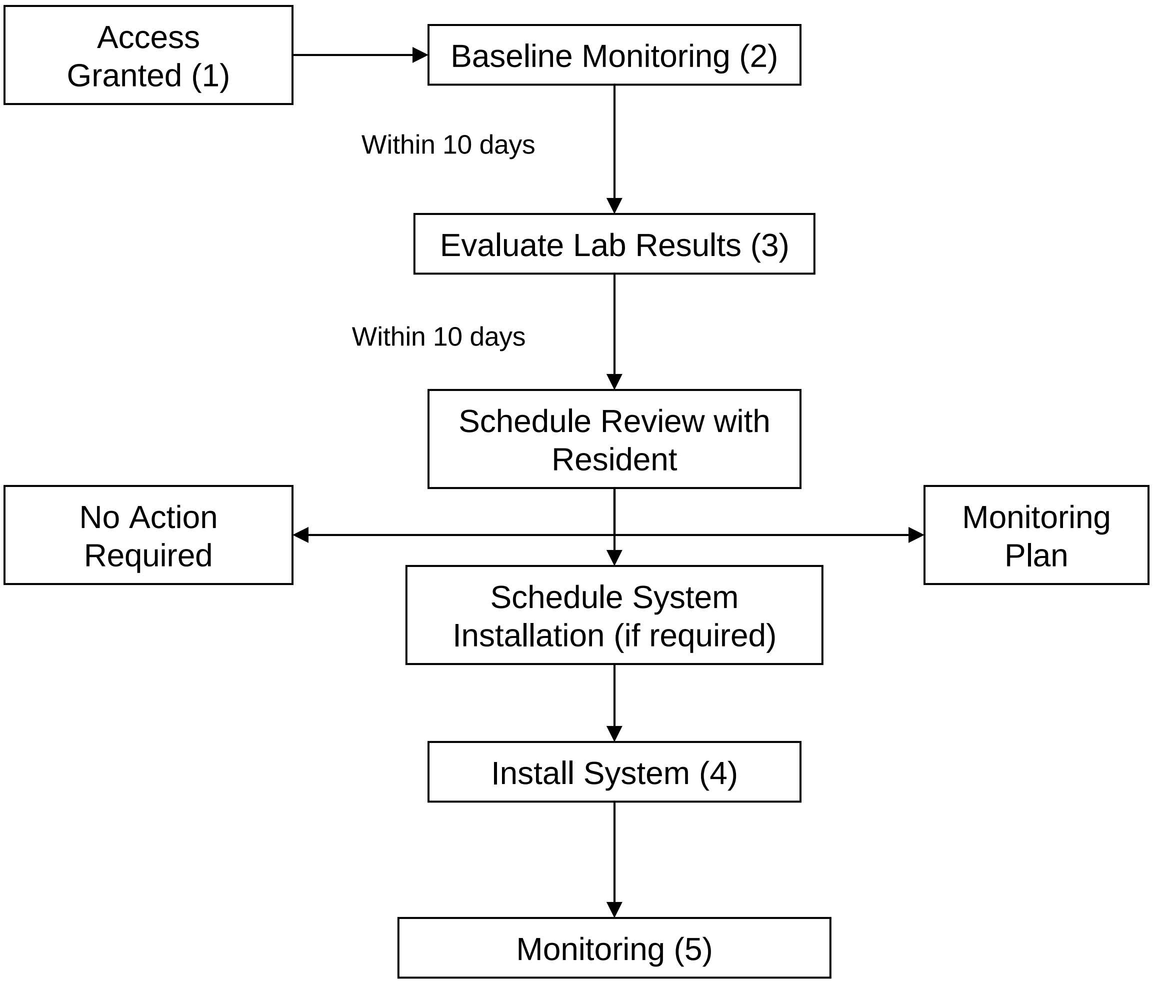
Attachment L

Project Schedule

Site Access Plan – Behr VOC Plume Site Dayton, Ohio



Project Schedule – Behr VOC Plume Site Dayton, Ohio



(1) See Access Plan (Section 4.2)
(2) As scheduled/agreed with resident (Section 4.4)
(3) See Section 4.5
(4) See Section 5
(5) See Section 6

ATTACHMENT C
BEHR VOC PLUME REPORT

BEHR VOC PLUME REPORT
FORMER DAIMLERCHRYSLER DAYTON THERMAL PRODUCTS PLANT
DAYTON, OHIO

Prepared for:

DaimlerChrysler Corporation
800 Chrysler Drive
Auburn Hills, MI 48326

Prepared by:

Earth Tech, Inc.
36133 Schoolcraft Road
Livonia, Michigan 48150

April 17, 2007

Earth Tech Project No. 98809

TABLE OF CONTENTS

List of Acronyms and Abbreviations

AOC	Administrative Settlement Agreement and Order on Consent for Removal Action
ASTM	American Society for Testing and Materials
Behr	Behr Dayton Thermal Products
bgs	below ground surface
cDCE	cis-1,2-dichloroethene
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
cfs	cubic feet per second
CL	clay
cm	centimeter
CNTS	Covenant Not to Sue
cu ft	cubic feet
CVOC	chlorinated volatile organic compounds
DaimlerChrysler	DaimlerChrysler Corporation
DAP	DAP Inc.
DCA	dichloroethane
DCE	dichloroethene
DCM	dichloromethane
DERR	Division of Emergency and Remedial Response (Ohio EPA)
DTP	Dayton Thermal Products
Earth Tech	Earth Tech, Inc.
EDR	Environmental Data Resources
FRS	Facility Registry System
ft	feet
Gem	Gem City Chemicals, Inc.
gpd	gallons per day
gpm	gallons per minute
GW	Well-graded gravel
Hg	mercury
HVAC	heating, ventilation, and air conditioning

IAQ	indoor air quality
LMMRB	Lower Miami and Mad River Basin
MCL	maximum contaminant level
mgd	million gallons per day
MIP/EC	membrane interface probe / electrical conductivity
msl	mean sea level
NPDES	National Pollutant Discharge Elimination System
O&M	operations and maintenance
O.D. PVC	outer diameter polyvinyl chloride
OAG	Ohio Attorney General
Ohio EPA (OEPA)	Ohio Environmental Protection Agency
PCE	tetrachloroethene
PRB	permeable reactive barrier
PRP	potentially responsible party
psig	pounds per square inch gauge
R&D	research and development
RCRA	Resource Conservation and Recovery Act
scfm	standard cubic feet per minute
sec	second
SIC	Standard Industrial Classification
sq ft	square feet
SVE	soil vapor extraction
SVE/AS	soil vapor extraction / air sparge
SW	Well-graded sand
TCA	trichloroethane
TCE	trichloroethene
TOC	top of casing
TRIS	Toxic Release Inventory System
U.S. EPA	United States Environmental Protection Agency
ug/L	micrograms per liter
VAP	Voluntary Action Program (Ohio EPA)
VDC	Van Dyne Crotty
VOC	volatile organic compounds

EXECUTIVE SUMMARY

DaimlerChrysler Corporation (DaimlerChrysler) has prepared this Behr VOC Plume Report (the "Report") in compliance with the Phase II Work Plan (dated March 23, 2007) that was developed pursuant to the Administrative Settlement Agreement and Order on Consent for Removal Action (the "AOC") issued by the United States Environmental Protection Agency (U.S. EPA) and signed by DaimlerChrysler in December 2006. This Report has been prepared to present the results of extensive investigation and analysis of groundwater conditions on and in the vicinity of the former DaimlerChrysler Dayton Thermal Products (DTP) plant located at 1600 Webster Street in Dayton, Montgomery County, Ohio. The plant is currently owned and operated by Behr Dayton Thermal Products, LLC (Behr).

The primary purpose of this Report is to provide a comprehensive summary of data gathered by DaimlerChrysler to support actions required under the AOC related to the potential migration of vapor-phase trichloroethene (TCE). The demarcation of the boundary of the AOC removal action area is important to implement an appropriate DaimlerChrysler response to TCE related to indoor air quality. DaimlerChrysler will conduct Phase II indoor air investigations within the boundaries of the defined removal action area.

The removal action area boundary has been defined through the collection and evaluation of the information and data presented in this Report, including: (1) the geologic setting, (2) groundwater flow patterns and variations, (3) release source areas, (4) soil and groundwater constituents, and (5) the distribution of groundwater constituents. The following conclusions have been reached:

- The primary groundwater flow direction beneath and south of the DTP site is to the south-southwest and is influenced by the rivers and groundwater extraction systems in the area. Variations in groundwater flow direction occur; however, these variations are infrequent and of short duration. These variations do not impact the DTP groundwater constituent migration direction associated with the DTP site.

- The groundwater flow patterns north of the DTP site are not currently well defined. Data indicate that a groundwater divide occurs somewhere to the north or northeast of the DTP site. Groundwater south of that divide generally flows to the south-southwest, and groundwater north of the divide generally travels north toward the Great Miami River. To further define the location of the groundwater divide, DaimlerChrysler is assisting the City of Dayton in conducting a groundwater elevation and flow direction study using pressure transducers to collect continuous water level data to the north of the DTP site.

- Groundwater flow patterns indicate that groundwater contaminants from upgradient properties are likely present beneath the DTP site, are currently being remediated as part of DaimlerChrysler's on-site groundwater containment and treatment activities, and likely migrated south of the DTP site

- Identified locations of DaimlerChrysler groundwater constituents are commingled with constituents from other releases in the vicinity of the DTP site.

- The removal action area to be addressed by DaimlerChrysler in compliance with the AOC is bounded as follows:
    - North – Stanley Avenue, i.e., the northern property boundary,
    - South – Keowee Street, and
    - East and West – Groundwater flow lines that define the lateral limits of DTP constituents.

- Public records searches have identified additional known and potential release sources of chlorinated solvents to the groundwater in the vicinity of the DTP site. Thus, historical DaimlerChrysler operation of the DTP plant is not solely responsible for the presence of TCE in the groundwater in the area of the DTP site. This Report provides the data and analysis to support the U.S. EPA and Ohio Environmental Protection Agency (Ohio EPA) efforts to compel participation of other potentially responsible parties to address area groundwater VOC contamination.

These conclusions provide the basis to implement and close the AOC. Since the boundaries of the removal action area to be addressed under the AOC have been defined, a Phase III investigation is not required. DaimlerChrysler will prepare and submit modifications to the Phase II Work Plan (previously submitted to the U.S. EPA and the Ohio EPA) to incorporate the Phase II removal action area defined in this Report. Upon approval of the modifications, the Phase II investigation will be conducted. Subsequent to the receipt and analysis of Phase II investigation results, further response activities, if required under the AOC, will begin.

1. INTRODUCTION

1.1 PURPOSE

DaimlerChrysler Corporation (DaimlerChrysler) has prepared this Behr VOC Plume Report (the "Report") compliance with the U.S. EPA approved Phase II Work Plan that was developed pursuant to the Administrative Settlement Agreement and Order on Consent for Removal Action (the "AOC") issued by the United States Environmental Protection Agency (U.S. EPA) and signed by DaimlerChrysler in December 2006. This Report has been prepared to present the results of extensive investigation and analysis of groundwater conditions on and in the vicinity of the former DaimlerChrysler plant located at 1600 Webster Street in Dayton, Montgomery County, Ohio. The plant is currently owned and operated by Behr Dayton Thermal Products, LLC (Behr or DTP).

The primary purpose of this Report is to provide a comprehensive summary of data gathered by DaimlerChrysler to support actions required under the AOC related to the potential migration of vapor-phase trichloroethene (TCE). The demarcation of the boundary of the AOC removal action area is important to implement an appropriate response to TCE related to indoor air quality attributable to past DaimlerChrysler operations. DaimlerChrysler will conduct Phase II indoor air investigations within the boundaries of the defined removal action area.

In addition, known and potential release sources of TCE and other chlorinated solvents in the vicinity of the DTP property are presented in this Report. Groundwater constituent data and groundwater flow measurements obtained to date from a public records search of other release sites have been incorporated in the evaluation presented in this Report.

1.2 SITE LOCATION

The DTP plant is located at 1600 Webster Street, in Dayton, Ohio. The property is situated between the Great Miami River to the north and the Mad River to the South, in Montgomery County, Ohio. The DTP property location is depicted on Figure 1-1. The latitude of the plant is 39 degrees, 47 minutes, 4 seconds. The longitude of the plant is 84 degrees, 10 minutes, 51 seconds.

The DTP plant occupies approximately 60 acres on which several buildings are located (approximately 1.4 million square feet under roof), as well as associated parking, outdoor storage areas and landscaped areas. The DTP property is bounded by Webster Street to the west, Air City Avenue, Giles Avenue, and Deeds Street to the east, Stanley Avenue to the north, and Leo Street to the south. The property layout is depicted on Figure 1-2.

Numerous documents describing the location and history of the former DaimlerChrysler operations of the DTP plant were previously submitted to the agencies, and readers of this Report are referred to those documents for additional information.

1.3 SITE HISTORY AND OPERATION

The complete history of the plant is unknown, but at least some of the buildings on the property were constructed circa 1907. Chrysler (now known as DaimlerChrysler) through former names operated at DTP since 1924, and in 1936 began to manufacture furnaces and commercial air conditioners.. The main tract was approximately 23 acres. Additional land was purchased in 1944 (7.5 acres), 1953 (17.5 acres), and 1965 (13.8 acres). DaimlerChrysler owned and operated the former DaimlerChrysler Dayton Thermal Product (Dayton Thermal) plant prior to the Behr's purchase of the plant in 2002. Behr currently utilizes the plant for the manufacture of parts and sub-assemblies of heating, ventilation, and air conditioning (HVAC) equipment for DaimlerChrysler and other car and truck manufacturers. The types of vehicle parts produced include such items as auto heater cores and air conditioner coils, radiators, and gasoline vapor canisters. The Standard Industrial Classification (SIC) Code for the plant is 3069. The plant employs approximately 2,500 employees working three shifts.

Currently, the DTP property contains the following operational areas:

- Administrative and engineering offices,
- Shipping,
- Storage,
- Manufacturing facilities,
- Wastewater treatment plant,
- Truck and trailer parking,
- Water pumphouse,
- Receiving, and
- Maintenance.

Dissolved chlorinated volatile organic compound (VOC) constituents that include TCE have been detected in the groundwater beneath the DTP plant. In situ bioremediation and groundwater containment are being utilized to remediate the constituents beneath the DTP property and prevent further off-property migration. The current remediation system has significantly reduced constituent concentrations as measured by the groundwater monitoring wells located on the DTP property and is achieving the goal of containment at the plant property line.

1.4 REGULATORY FRAMEWORK

The regulatory pathways to address groundwater TCE that DaimlerChrysler is currently following are described in this section. Groundwater impacts that may be attributable to DaimlerChrysler's past operations at the DTP plant are: (1) on-site impacts and (2) indoor air quality associated with off-site groundwater constituents. DaimlerChrysler has implemented responses to address these impacts as discussed below.

1. TCE in groundwater at the DTP property is currently being addressed through in situ bioremediation and containment under the Ohio EPA Voluntary Action Program (VAP). DaimlerChrysler intends to follow the conventional VAP approach that includes Ohio EPA review and approval of documentation, and will seek a Covenant Not to Sue (CNTS) from the Ohio EPA for the DTP property. Upon receipt of the CNTS, DaimlerChrysler will enter into an operations and maintenance (O&M) agreement with the Ohio EPA and conduct additional actions, if necessary, until attainment of applicable groundwater quality standards is achieved.

2. Removal actions required by the AOC are being addressed by DaimlerChrysler under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). DaimlerChrysler will continue to fulfill the requirements of the AOC under CERCLA and other applicable statutes and regulations until the removal action is complete. If additional actions are required to protect human health and the environment, DaimlerChrysler will conduct those activities under the Ohio VAP in conjunction with the ongoing on-site VAP action (or as a separate project under the Ohio EPA VAP).

1.5 RISK FRAMEWORK

In previous evaluations conducted as part of the current VAP on-site groundwater investigation and remediation work, no unacceptable risks to human health and the environment were identified for the off-site groundwater contaminants attributable to past DaimlerChrysler operations at the DTP plant. Since that evaluation was conducted, the U.S. EPA proposed a re-evaluation of TCE toxicity suggesting that it was more carcinogenic than the agency's earlier understanding (draft report released in 2001; the document remains a draft with no final toxicity determination). Although this re-evaluation is still contentious and under debate within and outside the U.S. EPA, the agency began to evaluate indoor air quality risk for humans using a cancer slope factor which is orders of magnitude greater than that used to make the initial risk evaluation for the DTP property. In addition, the agency also modified its mathematical model used to determine the extent to which migration of TCE vapors through soil and groundwater might intrude into indoor air. The use of the proposed increased TCE toxicity factor and the revised modeling approach resulted in a recent determination of potential indoor air concentrations in excess of applicable screening levels.

Given the current concern regarding the potential for indoor air concentrations in excess of applicable screening levels, the risk-based approach that underlies work proposed in the Phase I and II Work Plans focuses on severing the key exposure pathway most likely to result in unacceptable risk (i.e., the indoor air exposure pathway). In keeping with this objective, occupants in buildings requiring protection from potential vapor intrusion will be assessed via direct measurement of indoor air quality. Using the results of this assessment, EPA has determined that installation of interior TCE vapor abatement systems, based on the ASTM standard for radon mitigation, in structures impacted by TCE where the applicable Indoor Air Screening Level for TCE was exceeded constitutes the appropriate response action under CERCLA to address the human health and environmental risks. Abatement systems include installation of a sub-slab vapor removal system, sealing cracks in walls and floor of the basement, and/or sealing or fixing drains that could be a pathway.

Since, the direct contact groundwater pathway does not constitute a pathway likely to result in imminent exposure, rapid response to groundwater impacts is not required. As such, the Ohio VAP risk-based approach will be applied to groundwater TCE while the indoor air exposure pathway is eliminated by response actions implemented under the U.S. EPA AOC.

1.6 REPORT ORGANIZATION

The following additional sections are included in this Report:

Section 2 – This section presents a summary of the environmental investigations conducted on and in the vicinity of the DTP plant since 1994. Investigation objectives, investigation methods, sample locations, and results are described for each event.

Section 3 – This section describes the geology and hydrogeology in the area of the DTP plant, including groundwater flow, surface water interaction, and potable water use.

Section 4 – This section presents the results of an analysis of the nature and extent of TCE impacts to groundwater. It includes an evaluation of the TCE parent and daughter products, as well as identified and potential release sources of chlorinated solvents in the vicinity of the DTP property.

Section 5 – This section presents the outermost boundary of TCE groundwater impacts attributable to past DaimlerChrysler operation of the DTP plant and describes the removal action area to be addressed in compliance with the AOC. The criteria used to define the boundary of the removal action area are also presented in this section, and the conclusions derived from this evaluation are summarized.

2. ENVIRONMENTAL DATA

The groundwater quality in the vicinity of the Dayton Thermal Products plant has been investigated by DaimlerChrysler to evaluate the effect of potential historical releases of industrial solvents associated with the manufacturing process. Investigations began in 1994 with the installation of on-site groundwater monitoring wells. In 1999, off-site investigations were initiated to delineate the groundwater flow patterns and potential down-gradient plume migration.[1] A brief summary of the on-site and off-site investigations is presented below

2.1 GROUNDWATER MONITORING NETWORK ON DTP PROPERTY

The groundwater monitoring network on the DTP property, constructed from 1994 to 2003, was designed and installed to monitor upgradient groundwater, groundwater beneath the DTP property, and groundwater downgradient of the DTP property line. The investigation of groundwater began on-site and expanded downgradient in the direction of groundwater flow. The groundwater monitoring well network is presented on Figure 2-1. Soil boring logs and well construction diagrams are presented in Attachments 2-A and 2-B, respectively. A summary of the location and elevation of the monitoring wells is presented on Table 2-1. Groundwater sampling of this monitoring network has been conducted for the last 13 years.

2.2 GROUNDWATER DIRECT PUSH INVESTIGATION – APRIL 1999

Legette, Brashers & Graham conducted a Geoprobe® investigation in April, 1999 to further delineate groundwater constituent concentrations. Uncertainty in groundwater flow direction drove the direction of the Geoprobe® investigation efforts. Work was completed to the southeast and south of the Dayton Thermal Products plant as presented on Figure 2-1.

The Geoprobe® investigation was conducted at 61 locations across the investigation area. At each Geoprobe® location the following activities were completed:

- Soils were continuously sampled to the total depth of the boring, typically to a depth of 40 feet. Soil boring logs are presented in Attachment 2-C.

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[1] DaimlerChrysler has used Lancaster Laboratories, an Ohio certified laboratory for recent sample analyses. Prior to contracting with Lancaster Laboratories, DaimlerChrysler utilized CompuChem Laboratories, which is also currently a certified laboratory.

- Groundwater samples were collected by purging groundwater from the drill rods using a peristaltic pump prior to the collection of the groundwater sample. One or two groundwater samples were collected for analysis by a mobile lab to provide real time sample results to direct the field investigation.
- Groundwater samples collected from similar sample intervals were submitted to an analytical laboratory for VOC analysis by US EPA Method 8260. Detected compounds and the groundwater sample interval are summarized in Table 2-2.
- Drilling and groundwater sampling equipment were decontaminated between locations by pressure washing.
- Geoprobe® location and elevation were established by ground survey. Survey, soil boring, and groundwater sample information are summarized on Table 2-3.

2.3 GROUNDWATER MONITORING NETWORK - 2001

The design and construction of the permanent groundwater monitoring network was based on the results of the groundwater Geoprobe® investigation conducted off DTP property. In March and April 2001, Legette, Brashers & Graham installed 14 off-site monitoring well nests to monitor groundwater quality downgradient of the DTP plant and three off-site wells east of the plant to monitor the contaminant source area and the potential for the migration of contaminants to the east. The Permanent Groundwater Monitoring Network, located south and east of DTP plant, is presented on Figure 2-1.

The field investigation associated with the groundwater monitoring well installation included the following:

- Drilling activities were completed using Roto-Sonic drilling technology. Soils were continuously sampled to the total depth of the boring, typically to the top of the clay till at a maximum depth of 99 feet. Soil boring logs are presented in Attachment 2-A.
- Each well nest is comprised of a shallow well installed near the water table, an intermediate well, and a deep well installed above the clay aquitard.
- Well nest construction consisted of 2-inch PVC wells installed within a single borehole with a bentonite seal placed between the well screen filter pack intervals. Well construction information is presented in Table 2-4.
- Drilling and sampling equipment were decontaminated between well nest locations by pressure washing.

- Following well construction, locking well head protection was installed, the well top of casing (TOC) was surveyed, and the wells were properly developed.
- Dedicated groundwater sample bladder pumps were installed to facilitate groundwater sampling and reduce groundwater sample collection costs and eliminate the potential for cross contamination of the wells by the sampling equipment.
- Low flow groundwater sampling techniques are used at the well locations with dedicated bladder pumps.
- Groundwater samples are submitted to an analytical laboratory for VOC analysis by US EPA Method 8260. Select monitoring wells are also sampled for biogeochemistry and microbial diversity to monitor the natural attenuation potential for the contaminants in the aquifer.

2.4 MIP/EC GROUNDWATER QUALITY INVESTIGATION – 2003

Earth Tech, Inc. (Earth Tech) conducted a comprehensive evaluation of the regional groundwater flow and contaminant distribution in 2003 to investigate the potential horizontal and vertical extent of off-site groundwater contaminants associated with releases from the DTP plant source area. The plume delineation effort included a Geoprobe® investigation using a membrane interface probe / electrical conductivity (MIP/EC) to evaluate the vertical distribution of VOCs and stratigraphy prior to the collection of two representative groundwater grab samples. The objective of the field investigation, combined with existing groundwater monitoring well sample results, was to provide a snapshot of groundwater quality within the basin. For the purposes of this report, the basin has been generally defined as the area bounded by the Miami Well Field to the north, the Miami River to the west, the Mad River to the east, and the confluence of the Miami and Mad Rivers to the south. Based on an interpretation of contaminant distribution, multiple potential source areas have been identified within the basin and have clearly contributed to the current distribution of the basin-wide contaminant plume. The MIP/EC investigation area is presented on Figure 2-1.

The MIP/EC investigation was conducted at 67 locations across the basin. At each MIP/EC location the following activities were completed:

- Soil physical characteristics were evaluated by measuring the electrical conductivity of the soil across two electrodes built into the Geoprobe® MIP/EC probe. The soil electrical conductivity was continuously recorded as the borehole was advanced and evaluated in the field to identify significant clay layers or seams that would effect the collection of groundwater samples. The borings were advanced to the maximum depth of penetration capabilities of the direct push equipment.

- Volatile organic compounds in groundwater were evaluated by circulating nitrogen carrier gas across the heated membrane interface section of the MIP/EC probe and up to a field gas chromatograph. The VOCs in groundwater were continuously recorded as the borehole was advanced and evaluated in the field to identify potential zones of groundwater impacts for follow-up groundwater sampling. The MIP/EC field logs are presented in Attachment 2-D and are summarized on Table 2-5.
- Geoprobe® MIP/EC borehole abandonment was completed by removing the MIP/EC probe from the borehole and re-advancing conventional drill rod to abandon the borehole with bentonite slurry.
- Geoprobe® rods and the MIP/EC probe assembly were decontaminated between locations by pressure washing.
- Based on the results of the MIP/EC investigation, two or three sample intervals were identified to collect representative groundwater grab samples using a second Geoprobe® rig. The Geoprobe® was advanced to the deepest groundwater sample interval for the collection of the first sample and then retracted up to the shallow intervals to collect the subsequent samples.
- Each representative groundwater sample interval was purged with a peristaltic pump until groundwater chemistry stabilized or until three drill rod volumes were removed. Groundwater samples were collected using low-flow groundwater sampling techniques. New sample collection tubing was used for each groundwater grab sample interval.
- Groundwater grab samples were submitted to an analytical laboratory for VOC analysis by US EPA Method 8260. Detected compounds and the groundwater sample interval are summarized in Table 2-6.
- Geoprobe® rods and sampling probe equipment were decontaminated between locations by pressure washing.
- MIP/EC locations were established based on local permanent features.

2.5 Basin-wide Hydraulic Monitoring Program – 2003

A basin-wide hydraulic monitoring program was developed to provided an understanding of the regional groundwater flow regime and a framework to interpret the distribution and potential migration pathway of contaminants detected during the MIP/EC Geoprobe® investigation. Groundwater flow between the Miami and Mad Rivers was evaluated with 25 temporary wells and 6 river staff gauges, installed to monitor groundwater and surface water elevations. Rapidly changing groundwater levels required simultaneous readings and necessitated installing 46 pressure transducers across the monitoring well network.

The integration of the contaminant distribution data with the groundwater flow regime provides a comprehensive picture of the areas of existing groundwater impacts, potential contaminant source areas, and likely contaminant migration pathways. The location of the hydraulic monitoring points is presented on Figure 2-1.

The field investigation and follow-up monitoring activities associated with the basin-wide hydraulic monitoring program included the following:

- The boreholes for temporary well construction were advanced by direct-push methods to an estimated depth of 5 to 7 feet below the water table. Soil samples were not collected during drilling.
- Temporary wells were constructed of 1.25-inch O.D. PVC, 10-foot 10-slot wells screens, filter pack sand, and bentonite seal to ground surface. Temporary well construction information is presented in Table 2-7.
- Following temporary well construction, locking well head protection was installed, the well top of casing (TOC) was surveyed, and the wells were developed by using a peristaltic pump.
- Drilling and sampling equipment were decontaminated between well locations by pressure washing.
- Dedicated pressure transducers were installed in each temporary well and calibrated to the groundwater level. The pressure transducers have been moved periodically from the basin-wide temporary well network to locations nearer to the Dayton Thermal Products plant to monitor the performance of the groundwater remediation system. Transducer data is downloaded on an as needed basis for interpretation of groundwater flow.
- Surface water elevation of the Miami and Mad Rivers is measured periodically at six surveyed staff gauge locations. The elevation of surface water is direct measured from a known surveyed point on a bridge or dam.

2.6 LONG-TERM GROUNDWATER MONITORING – 2003 TO 2007

The groundwater monitoring well network is comprised of 101 permanent groundwater monitoring wells, and 25 off-site temporary groundwater monitoring wells. The permanent wells, located in the immediate vicinity of the plant, have been sampled for the last 13 years. The data provide insight into the groundwater contaminant concentration over time and the positive effects soil and groundwater source control conducted at the Dayton Thermal Products plant have had on the concentration of off-site contaminants.

The long-term groundwater monitoring effort monitors both on-site and off-site groundwater quality. On-site groundwater monitoring measures the performance of the groundwater extraction and containment activities to prevent off-site contaminant migration along the south property boundary. On-site groundwater monitoring also measures the effectiveness of the bioremediation system in operation at the DTP plant, which reduces the concentration of contaminants in the source area. Off-site groundwater monitoring measures the effectiveness of the containment and source area contaminant reduction activities at reducing the down gradient migration of contaminants from the DTP plant. The locations of the groundwater monitoring wells in the current long-term groundwater monitoring program are presented on Figure 2-1.

The long-term groundwater monitoring program includes the following:

- Groundwater sampling events are performed approximately two to three times per year.
- Selection of monitoring wells to be sampled during a given sampling event vary depending on specific data needs and well locations.
- Groundwater samples are submitted to an analytical laboratory for VOC analysis by US EPA Method 8260. Samples from select monitoring wells are also analyzed for biogeochemistry parameters and microbial diversity to monitor the natural attenuation potential for the contaminants in the aquifer. Detected compounds and the groundwater sample interval for groundwater samples collected in 2003 in conjunction with the Basin-wide Groundwater Quality Investigation are summarized in Table 2-8. Detected compounds and the groundwater sample interval for groundwater samples collected in January 2007 are summarized in Table 2-9.
- Groundwater samples are collected with dedicated groundwater sample bladder pumps or peristaltic pumps depending on the date the well was installed, if water elevation pressure transducers have been installed, and well construction (ie., 1.25-inch diameter well).
- Low flow groundwater sampling techniques are used at all well locations using either dedicated bladder pumps or a peristaltic pump.

2.7 OTHER HYDROGEOLOGIC/MONITORING DATA AND BACKGROUND SOURCES

A review of other hydrogeologic and monitoring data was conducted to help identify other parties potentially responsible for the commingled VOC contaminant plume downgradient of the DTP plant. The review consisted of examining site investigation reports of nearby properties and a well inventory search.

Reviews of reports filed with the Ohio EPA were conducted for the following facilities:

- Gem City Chemicals, 1287 Air City Avenue
- Aramark Uniform Services, Inc. (aka Aratex Services, Inc.), 1200 Webster Street
- Gayston Corporation, 55 Janney Road
- DAP Inc. 220 Janney Road
- Commerce Park Drive Investigation, Janney Road Area
- Environmental Processing Services, 416 Leo Street

Findings of these reports are incorporated into discussions of contaminant sources and groundwater flow in Sections 4 and 5 of this report. Hydrogeologic and monitoring data from the Commerce Park Drive Investigation, Aramark Uniform Services, and Gem City Chemicals were also incorporated into the regional delineation of constituents.

A monitoring and production well inventory search of the DTP vicinity produced 63 monitoring well records (22 of which are located on DTP property) and three production wells associated with the Miami Well Field. Of the 66 records, well construction reports were available for 50 wells.

A table summarizing well construction information and the well construction reports for located wells in and around DTP are provided in Attachment 2-E.

3. GEOLOGY AND HYDROGEOLOGY

This section presents the geologic setting (i.e., the geology and hydrogeology) and the hydrology in the area of the DTP property. An understanding of groundwater flow rates and directions, as well as factors that cause variation in the natural flow is essential in identifying the movement and extent of groundwater constituents associated with releases at the DTP property. The geologic setting described in this section was developed using documentation associated with regional geology, hydrogeology, and hydrology, as well as field observations and data collected during the investigations described in Section 2. The geologic setting encompasses the area from the confluence of the Miami and Mad Rivers north to the Miami River Well Field.

The regional geologic and hydrogeologic information presented in Sections 3.1 and 3.2 is based on the Groundwater Resources of the Dayton Area, Ohio, U.S. Geological Survey - Water Supply Paper 1808, prepared by Norris and Spieker, 1966. In general, the bedrock valleys in the area of the DTP property eroded by stream flow and later filled with sand and gravel glacial outwash deposits, resulting in highly permeable buried valley aquifers having a predominant groundwater flow direction from north to south. The hydrology of the Miami and Mad Rivers, in particular flood control spillways and surface water diversion basins associated with the rivers, further affects groundwater flow direction and rate. This arrangement results in a consistent groundwater flow pattern in the Lower Miami and Mad River Basin (LMMRB), as will be further described in this section. As noted, local and DTP property-specific information used to develop the setting was obtained during the installation of water supply wells, soil borings, and groundwater monitoring wells in the area of the Behr VOC Plume.

3.1 REGIONAL GEOLOGY

Sections 3.1 and 3.2 include descriptions of the overall geologic and hydrogeologic conditions in the area of the DTP property by presenting and evaluating the factors that influence the types of geologic deposits and their hydrogeologic properties.

The regional geology of the Dayton area is a direct result of stream erosion into the soft Ordovician shale bedrock lithology and the subsequent deposition of glacial drift into these valleys before and during the last glacial advance. These processes controlled the contrasting types of glacial deposits and their hydrogeologic properties, which dictate the present groundwater and surface water flow system in the LMMRB.

Early glacial advances of the Pleistocene Epoch disrupted the existing east to west Teays drainage system across northern Ohio by damming the flow channel, producing widespread lakes in the valleys of the Teays River and its principal tributaries, and establishing a north to south drainage pattern. The post-Teays drainage system, called Deep Stage, was a period of bedrock valley erosion and entrenchment. Streams of the Deep Stage system in the Dayton area cut the soft Ordovician shale bedrock valleys to their present depths, well below Teays levels, and followed courses similar to those of the modern streams. The Deep Stage drainage system likely conveyed the meltwater of the Nebraskan and Kansan glacial retreat to the south. The main stream flowed southward, along the courses now followed by the Mad and Miami Rivers, to the ancestral Ohio River.

These Deep Stage streams, flowing on the Ordovician shale, discharged the meltwaters of glacial retreat up to the time of the Illinoian glacial advance. During this time, the Deep Stage streams did not attain a stable graded condition or elevation and were continuing to erode their valleys. The minimum bedrock floor elevation of the buried valley in Dayton is at or a little below 500 feet mean sea level (msl). The depth to bedrock in the area approaches 250 feet. The bedrock contours presented on Figure 3-1 show the configuration of the buried channels produced by the Teays and Deep Stage streams. Four stream tributaries to the ancestral Miami River converge in what is now downtown Dayton and formed a wide deep trough, which glacial-outwash materials later filled.

Of the four Pleistocene Epoch glacial stages, the Illinoian and Wisconsin, reached the Dayton area. The Deep Stage drainage system was ended by the advance of the Illinoian ice sheet into and beyond the Dayton area, disrupting the surface water drainage patterns. The wide valleys at Dayton, which were cut deeply into the bedrock, were filled during the ensuing glacial stages principally with sand and gravel, laid down as outwash by melt water, and with glacial till, which occurs as lenses and layers interbedded with the sand and gravel deposits. The outwash deposits are referred to as valley train deposits because the stream flow was confined to the wide valleys of the Dayton Area.

The Illinoian glacier advanced southward to points a few miles south of Cincinnati, and receded from the western Ohio area about 200,000 years ago. Evidence of Illinoian and older glacial stages has not been recognized in Ohio. Ice of Wisconsin age covered much of Ohio as recently as 14,000 years ago and the glacier stopped a few miles north of Cincinnati. During the long interval between the Illinoian and Wisconsin glacial stages, which may have lasted more than 100,000 years (Goldthwait, in Norris and others, 1948, p. 28; Rubin, 1960, p. 289), most of the material deposited by the Illinoian and earlier glaciers likely was removed from the bedrock valleys by stream erosion.

The Wisconsin-age deposits in western Ohio have been related to two substages, corresponding to early and late Wisconsin time. The early Wisconsin advance reached western Ohio more than 37,500 years ago and retreated. The last major advance of the Wisconsin ice commenced between 25,000 and 19,500 years ago and had receded from Ohio about 14,000 years ago (Goldthwait, 1959, p. 198, 199, 211, 215). With the onset of the Wisconsin glacial advance, tongues of ice moved southward in advance of the main ice mass. The early and late Wisconsin glacial substage is responsible for depositional sequence of the valley-train outwash deposits and glacial till layers present in the bedrock valleys.

The early Wisconsin glacial advance deposited till on or only slightly above the bedrock in most of the Dayton area, and deposited a thick sequence of sand and gravel during glacier retreat. The interval between the end of the early Wisconsin substage and the beginning of the late Wisconsin substage was not long enough for the streams to erode the early Wisconsin sand and gravel deposits from the valleys. As the late Wisconsin ice sheet advanced to the Dayton area, a clay-rich till zone was deposited over the early Wisconsin sand and gravel deposits. During the glacial retreat, a second thick sequence of sand and gravel was deposited over the clay-rich till zone. The late Wisconsin valley glaciers are mainly responsible for the extensive deposits of till that occur nearly everywhere in the valley-train deposits. The interbedded till deposits are relatively thick and extensive in central Dayton, where four valley glaciers coalesced. Well-defined till sheets, buried by 30-60 feet of sand and gravel, extend almost entirely across the major valleys and, in some parts of the Dayton area, separate the sand and gravel valley-train deposits into two or more distinct aquifers.

The local readvance of the late Wisconsin glacier also deposited a relatively shallow till layer in the Miami River valley in central and northern Dayton and in the lower Mad River valley

(Goldthwait, in Norris and others, 1948, p. 34). In most places these shallower till deposits are thinner and less extensive than those associated with the main advance of the late Wisconsin glacier. However, in central Dayton the shallower till is thicker and more extensive than the lower till.

The valley train deposits, in most places, are separated into an upper sand and gravel unit and a lower sand and gravel unit by the clay-rich till zone. The depositional sequence and stratigraphic correlation of these units in the area of north Dayton are presented on geologic cross sections A-A' and D-D'-D" on Figure 3-2. The upper and lower sand and gravel units, the clay-rich till zones, and the estimated configuration of the incised valleys are presented on the figures. Cross-section D-D' trends southeast northwest and includes the DTP production wells to provide a regional geologic perspective of the project area.

3.2 Regional Hydrogeology

Groundwater flow in the Dayton area occurs within the upper and the lower sand and gravel aquifers. The aquifers are contained horizontally and vertically within the low permeability bedrock valleys eroded into the Ordovician Shale. Regional groundwater flow in both aquifers is toward the south, following the down grade direction of the Deep Stage valleys. The aquifers are separated vertically by a till-rich zone, which occurs as an aerially extensive layer of till or as closely associated till lenses and masses.

The glacial deposits range in thickness from 150 to 250 feet and consist generally of an upper and a lower sand and gravel aquifer, each ranging from 30-75 feet thick. The upper aquifer is extensively pumped at the City of Dayton Rohrers Island and Miami River well fields where water levels are kept high by artificial recharge. Elsewhere, this aquifer is not thick enough to allow sufficient drawdown for the development of high-capacity wells.

This low permeability clay-rich till zone, which ranges in thickness from 10 to 50 feet thick and occurs at depths ranging from 30 to 75 feet below the surface, confines water in the lower aquifer. Recharge to the lower aquifer, in which most high capacity production wells are screened, occurs largely by vertical leakage through the clay-rich till zone. Where the clay-rich till zone it is absent, the two aquifers are hydraulically connected.

Wells in the Dayton area typically range in depth from 60 to 175 feet and commonly yield 250-2,500 gallons per minute. The coefficient of permeability of the lower aquifer ranges from 1,000 to 2,500 gpd (gallons per day) per sq ft, and its coefficient of transmissibility ranges from 40,000 to an estimated 250,000 gpd per ft. Where the clay-rich till zone is absent, the transmissibility may be as high as 500,000 gpd per ft. The leakage coefficient of the till zone at the municipal well field on Rohrers Island, in the Mad River valley, was computed as 0.001-0.012 gpd per cu ft and the coefficient of vertical permeability of the till of this zone as 0.03-0.13 gpd per sq ft.

Groundwater recharge in the Dayton area occurs primarily as infiltration of stream flow through the streambed into the upper aquifer and secondarily as infiltration of precipitation. Thus, the availability of ground water depends not only on the physical properties of the aquifers but also on the character of the surface water flow and the rate at which water can percolate through streambeds under various conditions. Discharge measurements made at several points along the Mad and Miami Rivers on October 4, 1960, at a time of very low flow, showed that the rate of infiltration through the streambeds averaged about 1.7 million gallons per day (mgd) per acre in artificially ponded areas on Rohrers Island and about 0.07 mgd per acre in the reach of the Miami River extending south from the Main Street Bridge in downtown Dayton. The infiltration rate in this part of the Miami River channel was probably at a minimum when the discharge measurements were made. Infiltration is estimated to be much higher, averaging about 0.75 mgd per acre, when the discharge at the Main Street gage is equal to or greater than about 2,000 cfs (cubic feet per second). Flows of this magnitude occur about 20 percent of the time during which ground-water levels consistently rise in this area.

3.3 REGIONAL HYDROLOGY

This section presents the hydrologic features in the area of the DTP property that significantly affect groundwater flow. The hydrology information presented below, combined with the previously presented geology and hydrogeology information, form the regional geologic setting for the DTP property.

The gently sloping terrain, from an elevation of 760 feet above mean sea level (msl) in the north to 740 feet msl in the south, is typical of the expansive outwash plain present at the confluence of Miami and Mad Rivers. The ground surface elevation at the former Dayton Thermal Products plant is approximately 750 feet msl. The local surface water bodies, the Miami, Mad, and Stillwater Rivers significantly affect the groundwater flow dynamics and are entrenched into the broad outwash plain as a result of stream channel erosion following the retreat of the Wisconsin glaciers.

Modification of the Miami and Mad river channels occurred following the flood of 1913 when water levels in Dayton rose to record heights, flooding a significant portion of the city. The Miami Conservancy District, formed in 1914, widened the Miami River by dredging, relocated encroaching structures and businesses, and constructed levees and dams to increase in-stream storage and control stream flow. On the Miami River, the Island Park Dam, 3,500 feet upstream of the Mad River confluence maintains a spillway elevation of 737.92 feet mean sea level (msl). On the Mad River, the Hoffman Dam located approximately 5 miles upstream from the Miami River confluence was constructed with permanent discharge slots designed to meter outflow and prohibit between-storm storage. The Englewood Dam on the Stillwater River was constructed with similar discharge slots approximately 9 miles upstream from the Miami River confluence.

The Miami River discharge at Dayton, at river mile 80, ranges from 712 to 17,100 cubic feet per second (cfs) with a mean of 4,410 cfs. The Mad River discharge near Dayton, at river mile 6.1, ranges from 294 to 3,130 cfs with a mean of 1,040 cfs. The Stillwater River discharge at Englewood, at river mile 8.5, ranges from 121 to 5,720 cfs with a mean of 652 cfs. Based on river discharge, the Miami River carries the predominant flow of the river system.

Surface water from the Miami and the Mad Rivers is diverted into infiltration basins to facilitate groundwater recharge at both the Miami River and the Rohrers Island municipal well fields.

3.4 SITE GEOLOGY

The glacial deposits and topographic relief in the Behr VOC Plume investigation area were created when the early and late Wisconsin glacial ice front advanced and retreated over the Dayton area. Each successive advance deposited a clay-rich till zone followed by outwash deposits as the glacier retreated. The glacial deposits contain and control groundwater occurrence and movement in the area. Geologic logs from local groundwater production wells and soil borings from monitoring well installations confirm the regional stratigraphic sequence of the lower sand and gravel unit overlain by a clay-rich till zone and then the upper sand and gravel unit. Isolated clay-rich till units present within the upper sand and gravel unit indicate till and overlying outwash associated were also deposited by the local readvance of the late

Wisconsin glacier in the vicinity of the Behr VOC Plume investigation area. These shallower till deposits are thinner and considerably less extensive than the clay-rich till zone associated with the main advance of the late Wisconsin glacier. Groundwater monitoring well and production well locations are presented on Figure 2-1. Soil boring logs and monitoring well construction diagrams completed in conjunction with DTP property investigations are presented in Attachments 2-A and 2-B, respectively. Production well logs are presented in Attachment 3-A.

The stratigraphy of the investigation area is based on soil borings completed during environmental investigations and deep production wells installed for industrial water supply. The upper sand and gravel unit extends from the ground surface to the top of the clay-rich till zone and ranges in thickness from 77 to 102.5 feet below ground surface (bgs). The upper unit, a well graded gravel and medium to coarse sand (GW-SW), contains occasional isolated silt and clay layers that range in thickness from several feet to 20 feet and occur at depths ranging from 14 to 55 feet bgs that appear to be erosional remnants of the late Wisconsin glacial advance. Gravel and cobble zones are also present in this upper unit.

The clay-rich till zone is laterally extensive across the investigation area at a depth ranging from 77 to 102.5 feet bgs. This unit, described as a soft to firm gray silt and clay with medium to fine sand and trace gravel (CL), ranges from 7 feet to 21 feet in thickness. The top of the clay-rich till zone ranges in elevation from 650 to 670 feet msl in the investigation area.

The lower sand and gravel unit extends beyond the maximum depth of the production wells completed at the Dayton Thermal Products plant. This unit is described as fine to coarse sand and gravel, trace silt (SW).

The correlation of the stratigraphy in the Behr VOC Plume investigation area is presented on Figure 3-3. Geologic cross-section A-A’ trends north-south and parallel to the groundwater flow direction. Cross-sections B-B’ and C-C’ trend east-west and perpendicular to the groundwater flow direction.

3.5 SITE HYDROGEOLOGY

The hydrogeology of the Behr VOC Plume investigation area is characterized by three distinct hydrostratigraphic units comprised of an upper sand and gravel aquifer, an intermediate and laterally extensive clay aquitard, and a lower sand and gravel aquifer. The groundwater flow direction and rate of the upper aquifer is driven by groundwater recharge from the Miami and Mad Rivers located to the west and east, respectively, The Miami River and Rohrers Island Municipal Well Fields, and the basin discharge point located downstream from the Miami River Island Park Dam. Localized pumping centers also have the potential to affect groundwater flow in the upper aquifer, primarily, the Gem City Chemicals, Van Dyne Crotty, Commerce Park Drive, and DAP Inc. groundwater remediation systems located north and east of the plant. DaimlerChrysler is currently working with the City of Dayton to install pressure transducers in the City monitoring well network to better understand groundwater flow direction immediately north of DTP. A summary of each of the hydrologic units is described below:

Upper Sand and Gravel Aquifer

The upper sand and gravel aquifer is the surficial aquifer in the investigation area and is present at water table conditions. The saturated thickness of the upper sand and gravel varies across the LMMRB from 55 feet at monitoring well location MW-31D in the north to 85 feet at monitoring well location MW-37D located south of DTP. The unsaturated zone ranges from 10 to 26 feet thick depending on groundwater elevation and ground surface topography.

A total of 21 in situ hydraulic conductivity tests were performed at 11 locations to evaluate the hydraulic conductivity at various depth intervals within the aquifer. The hydraulic conductivity data evaluation was performed using the AQTESOLV program and a program developed by the Kansas Geological Survey to evaluate the oscillating data collected during some of the field tests. The hydraulic conductivities calculated using the AQTESOLV program ranged from 0.001 to 0.20 cm/sec (4 to 560 ft/day) and 0.03 to 0.09 cm/sec (96 to 264 ft/day) using the oscillating data program. The hydraulic conductivity of the adjacent Gem City extraction well pump test data is approximately 0.23 cm/sec (750 ft/day), which is similar to the values calculated using the AQTESOLV data analysis. This compares to regional hydraulic conductivity data for the upper sand and gravel aquifer determined for other environmental investigations in the basin.

The horizontal groundwater hydraulic flow gradient, measured over 1.3 miles from the TW-21 at DTP to TW-16 at the Miami River groundwater discharge area is 0.0013 ft/ft. The groundwater flow rate ranges from 1.18 (269 ft/day hydraulic conductivity value) to 2.50 (560 ft/day hydraulic conductivity value) feet per day. Due to the increase in groundwater gradient from DTP to the Miami River, incremental gradient calculations indicate the flow gradient and corresponding flow rate increases from 0.0016 ft/ft (1.98 to 0.93ft/day) near DTP, to 0.00059 ft/ft (1.11 to 0.52

ft/day) in the central portion of the LMMRB, to 0.0023 ft/ft (4.32 to 2.03 ft/day) as the hydraulic gradient increases near the discharge point.

The vertical groundwater hydraulic flow gradient measured at nested well pairs completed in the upper sand and gravel aquifer ranges from slightly downward to upward and is primarily non-existent in three of the six well nests measured. The vertical gradient varies in magnitude between -0.0005 ft/ft (downward) and 0.0023 ft/ft (upward). The slight downward gradient value of -0.0005 ft/ft occurs at the MWA-2/PZ-16D well cluster in the central portion of DTP with the non-existent gradients located to the north and upward vertical gradients located to the south.

The overall relationship of horizontal to vertical hydraulic gradients indicates a laminar flow field in the investigation area with flow primarily from the groundwater recharge areas associated with the Miami and Mad Rivers south toward the Miami River discharge area, as expected based on the regional hydrogeologic setting.

Lower Sand and Gravel Aquifer

The lower sand and gravel aquifer was encountered while drilling three monitoring wells at DTP and three of the four production water supply wells. The unit is described as non-uniform sand and gravel with occasional silty sand and gravel beds. No significant clay layers that would impede groundwater flow were encountered during drilling in the lower sand and gravel unit.

The lower sand and gravel aquifer is the deep aquifer in the investigation area, is isolated from the upper sand and gravel aquifer by the clay-rich till zone, and is present under confined aquifer conditions. The clay-rich till zone, impedes the vertical movement of groundwater between the upper and lower aquifers.

The hydraulic conductivity in the lower sand and gravel aquifer has not been measured by in situ hydraulic conductivity testing and is assumed to be similar to that of the upper sand and gravel aquifer based on the valley train depositional environment. The vertical groundwater hydraulic flow gradient across the clay aquitard measured at the three nested wells completed in both the upper and lower sand and gravel aquifers is downward at three well nest locations -0.0373 ft/ft (MWB-1/MWC-1), -0.0119 ft/ft (MW-18S/MWC-2), and -0.0009 ft/ft (MW-11S/MWC-3). The vertical hydraulic gradient within the lower sand and gravel aquifer was not determined due to the need to install additional monitoring wells deeper into the lower sand and gravel aquifer. The groundwater flow under confined aquifer conditions is likely a laminar flow field with flow primarily to the south in the downgradient flow direction of the valley-fill aquifers. This flow direction may be influenced by the municipal well fields and localized pumping centers.

Groundwater Flow Characteristics

Groundwater level measurements from monitoring wells installed at the DTP plant have been recorded since as early as 1994. Groundwater elevations have fluctuated significantly over this period and correspond to the seasonal fluctuations recorded in the upper aquifer elsewhere in the Dayton area. Seasonal fluctuations, typical of the upper aquifer, are presented on Figure 3-4.

The groundwater elevation of the highly permeable sand and gravel aquifer responds within approximately 24 hours to Miami and Mad River stage fluctuations as shown on Figure 3-5 for the period of November 11 to 23, 2003. The Miami River gage stations are located 0.8 miles downstream of the Mad River confluence in downtown Dayton and 9.5 miles upstream from the Stillwater River confluence. The Mad River gage station is located 300 feet up stream of Hoffman Dam. The groundwater elevation data was recorded at monitoring wells TW-2, TW-3, and TW-7 located 2,500 feet west, 1200 feet southwest, and 2000 feet west of DTP, respectively. The monitoring wells were selected because they are located outside the radius of influence of the Gem City Chemicals groundwater recovery well.

The rapid response in groundwater elevation to river stage fluctuation demonstrates the control river stage has on the overall groundwater elevation in the LMMRB. The Miami River Island Park Dam, located 3,500 feet upstream from the confluence with the Mad River, serves as a constant hydraulic head source for groundwater recharge to the LMMRB groundwater flow regime resulting in a consistent groundwater flow direction in the western portion of the basin from west to east as shown on Figure 3-6. The Mad River groundwater recharge basins associated with the Rohrers Island Well Field induces a constant hydraulic head for groundwater recharge in the northeast portion of the basin resulting in a consistent groundwater flow direction in the eastern portion of the basin from northeast to southwest. This pattern of groundwater recharge and flow direction toward the central portion of the LMMRB establishes a basin-wide groundwater flow path toward the section of the Miami River downstream of the Island Park Dam to the confluence with the Mad River, where the surface water hydraulic head influence is at its lowest elevation.

The groundwater flow direction in the northern portion of the LMMRB is not well understood based on available information. The effects of the basin wide hydraulic influences on the northern portion of the LMMRB include: the upper aquifer recharge and pumping at the Miami River and Rohrers Island (Mad River) Well Fields, the groundwater flow dynamics of the buried valley aquifers, and the localized influences around groundwater remediation system pumping centers. These factors preclude the evaluation or interpretation of groundwater flow patterns and contaminant migration in the northern portion of the LMMRB at this time.

As demonstrated by Figure 3-6, groundwater elevation changes in the central portion of the LMMRB due to fluctuation in the Miami and Mad River stages are the same as groundwater elevation changes in wells located closer to the surface water bodies. The overall groundwater flow direction remains unchanged seasonally, as indicated by low fall groundwater elevations shown on Figure 3-6 and seasonal high spring-time groundwater elevations shown on Figure 3-7. Groundwater flow in the central portion of the LMMRB remains to the south, toward the groundwater discharge point located on the downstream side of the Miami River Dam. The characteristics of the groundwater flow regime in the central portion of the basin have a direct effect on the interpretation and prediction of groundwater and contaminant migration from multiple source areas, as is the case in the Behr VOC Plume investigation area. Groundwater elevation information is summarized in Table 3-1.

The rapid fluctuation in groundwater elevation can result in erroneous interpretation of groundwater flow direction. Groundwater elevation changes in the LMMRB as great as 0.94 feet in 24-hours have been recorded by the pressure transducers deployed in the Behr VOC Plume groundwater monitoring well network. Prior interpretation of groundwater elevations collected over a one to two day period lead to a variable groundwater flow direction depending on the rate of the groundwater fluctuations in the LMMRB. By not recognizing and accounting for the LMMRB groundwater level fluctuations, erroneous data likely were integrated into the groundwater contour map and interpreted groundwater flow direction. The close proximity of the Gem City Chemicals groundwater remediation recovery well may also have affected the groundwater flow patterns. Following the installation of the 33 pressure transducers and the selection of a specific consistent time for water level measurement, the groundwater flow direction has remained consistent since 2003 as shown on Figures 3-6 and 3-7.

3.6 THE BEHR VOC PLUME AND GROUNDWATER FLOW

As discussed above, the characteristics of the groundwater flow regime in the central portion of the LMMRB have a direct effect on the interpretation and prediction of groundwater contaminant migration. The use of pressure transducers has enabled simultaneous groundwater level measurements and subsequently, groundwater flow direction has remained consistent toward the south since 2003. The delineation of the VOC plume and contaminant migration pathway, mapped in 2003, corresponds to the groundwater flow direction to the south. The extent of the VOC plume and LMMRB groundwater flow direction, mapped in 2003, is presented on Figure 3-8.

4. NATURE AND EXTENT OF GROUNDWATER CONSTITUENTS

This section presents an analysis of the nature and extent of groundwater constituents in the vicinity of the DTP site, including; 1) groundwater flow patterns, 2) potential sources areas, constituents and remedial activities, including effects on constituent migration, and 3) constituent distribution within the LMMRB. Section 5 discusses the definition of the Behr VOC plume based on the nature and extent of groundwater constituents and groundwater flow presented below.

This section divides the discussion of the nature and extent of groundwater constituents in the LMMRB into three areas: 1) The area north of the DTP plant; 2) The DTP plant boundary and adjacent source areas; and, 3) The area south of the DTP plant. This division was due to the differences in processes affecting constituent distribution north and south of DTP.

4.1 LMMRB GROUNDWATER FLOW

Groundwater flow within the LMMRB has been generally mapped through the integration of DTP site groundwater monitoring wells, off-site groundwater monitoring wells, temporary wells, river stages, and data obtained from other source investigations. Locations of measurement locations considered in this evaluation are shown on Figure 2-1. Analysis of this information resulted in the construction of the groundwater contour maps provided in Figures 3-6 and 3-7. Plume movement downgradient of the DTP plant is consistent with this flow map. Constituents are shown to start from the source areas and move with groundwater flow to the LMMRB discharge point located downstream of the Miami River Island Park Dam spillway. Groundwater flow and constituent transport is dependent on a number of factors which are generally different between the upper, middle, and lower sections of the basin based on groundwater flow and source conditions. Groundwater flow is summarized below.

Groundwater flow moves from areas with higher groundwater elevations (recharge areas) towards areas with lower groundwater elevations (discharge areas). Groundwater recharge areas are typically areas with significant precipitation infiltration or leakage from surface water bodies while discharge areas are typically streams, wetlands or artificial discharge areas such as pumping wells.

The Miami River Island Park Dam pool, located 3,500 feet upstream from the confluence of the Miami and Mad Rivers, serves as a constant hydraulic head source for groundwater recharge to the central and lower LMMRB groundwater. This results in a consistent groundwater flow direction in the western portion of the basin from west to east as shown on Figures 3-6 and 3-7. The Mad River groundwater recharge basins associated with the Rohrers Island Well Field also act as a constant hydraulic head recharge area in the northeast portion of the basin. This causes groundwater flow in the northeastern portion of the basin to likely flow in a radial direction from the recharge basin to the southwest, west, and north-northwest. These groundwater recharge areas generally result in flow from the north toward the central portion of the LMMRB and then towards the Miami River from downstream of the Island Park Dam to the confluence with the Mad River. The confluence area is where the surface water hydraulic head is lowest. Groundwater elevation data collected 1,200 feet north of DTP confirm a southerly flow direction in the immediate area north of DTP in 2003 and 2007.

The groundwater flow direction in the northern portion of the LMMRB is not well understood primarily because there is not a widely distributed groundwater hydraulic monitoring network nor is there a coordinated water elevation monitoring program. As a result, groundwater flow and the migration of constituents appear to be interpreted on a site-by-site basis through each individual site monitoring well network.

The groundwater flow direction in the northern portion of the LMMRB is influenced by upper aquifer recharge and pumping at the Miami River and Rohrers Island (Mad River) Well Fields, changes in aquifer transmissivity from the presence of buried valley aquifers, as well as the localized influences associated with groundwater remediation system pumping centers. The incomplete understanding and interaction of these influences preclude the evaluation or interpretation of groundwater flow patterns and constituent migration in the northern portion of the LMMRB. Groundwater flow information for the Van Dyne Crotty facility indicates groundwater flow and associated constituent migration is toward the north-northwest in the direction of the Miami River Well field. The Van Dyne Crotty facility is located 4,800 feet east of DTP suggesting a reversal in groundwater flow, from southwest to northwest, occurs between the two facilities. This reversal in flow is not inconsistent with current data in this report.

These groundwater flow patterns control and bound potential constituent movement from the DTP site and provide an initial basis for defining the Behr VOC plume. Groundwater flow as discussed and depicted in this section was then coupled with information on constituent sources and movement, along with influences of remediation systems. Combining flow and constituent information provides additional insight on how the groundwater system functions and further refines the understanding of potential constituent movement from the DTP site.

4.2 LMMRB SOURCE AREAS AND REMEDIAL ACTIONS

Small and large quantity generators and contaminated sites located within the LMMRB were identified by searching the following databases: Ohio EPA Division of Emergency and Remedial Response (DERR), USEPA Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), USEPA Facility Registry System (FRS), USEPA Resource Conservation and Recovery Act (RCRA) Info, and USEPA Toxic Release Inventory System (TRIS).

Results of the searches are included as Attachment 4-A. More than eighty-five hazardous waste generating facilities were identified within the basin. Figure 4-1 shows their locations. Of these facilities, 15 have documented on-site contamination or have reported hazardous waste releases to USEPA, six of which include chlorinated solvent releases. Table 4-1 summarizes probable and potential LMMRB contributors to area groundwater impacts based on documented releases, onsite contamination, and types of chemicals used. It is important to note that some of the compounds released degrade to TCE and therefore are potential contributors to TCE in groundwater. Figure 4-2 shows the locations of known remediation systems associated with these facilities. Figure 4-3 depicts the basin-wide extent of contamination.

4.2.1 Source Areas North of DTP

Source areas north of the DTP site are important to the Behr VOC Plume definition because groundwater flow from these sites could likely be towards and beneath the DTP site. Consequently, groundwater constituents released from those source areas may be contributing to the VOC groundwater plume detected beneath and downgradient of the DTP plant.

Van Dyne Crotty

Van Dyne Crotty (VDC), located at 903 Brandt Pike, Dayton, Ohio, operates an industrial laundry and textile leasing facility. VDC is located approximately one mile east of DTP. In December, 1985, the failure of a 1,000-gallon above ground storage tank resulted in the release of an unknown quantity of PCE to site soils and an on-property storm water retention basin.

Response actions were taken immediately following the incident. In early 1988, residential wells more than 1/2 mile downgradient were found to be contaminated by PCE and its degradation products. A subsequent investigation by the Montgomery County Combined Health District and Ohio EPA determined that the source of the PCE in groundwater to be the VDC facility.

VDC and Ohio EPA entered into an Administrative Order on Consent (AOC) in January, 1991, in which VDC agreed to implement an interim action that would 1) provide the City of Dayton with a water treatment system, 2) provide affected residential well owners with hookups to the municipal water system, and 3) construct a ground water gradient control system on-property to prevent further off-property migration of contamination. VDC completed the first two requirements on schedule but was referred to the Ohio Attorney General (OAG) in late 1991 for failure to satisfactorily comply with the third requirement. VDC and the OAG entered into a Consent Decree in November, 1992, enjoining VDC to comply with the 1991 AOC. VDC constructed the ground water gradient control system in 1993 and it has been operating since that time.

In 1996, VDC began a program to voluntarily remove the source of PCE contamination through the use air sparging and soil vapor extraction. This source removal system is currently in operation. Ohio EPA is monitoring the effectiveness of the ground water gradient control system to ensure that it is not adversely affected by the air sparging and soil vapor extraction system.

DAP Inc.

The DAP facility, located at 220 Janney Road, reported a release of contact cement in October, 1989. The DAP Inc. site is located adjacent to the Miami River and immediately north and adjacent to the CSX railroad tracks, approximately 2,800 feet north of DTP. In 1989, volatile organic compounds (VOCs) were detected in the Miami River well field located across the Miami River from the DAP facility. The City of Dayton notified Ohio EPA of their findings, and subsequent Ohio EPA investigations confirmed that DAP was the source of the VOC contamination. In May 1990, Ohio EPA issued a Unilateral Order to DAP requiring the company to prevent further off-property migration of the VOC contamination. The site is located within the City of Dayton wellhead protection area.

In response DAP installed four ground water extraction wells, treating the extracted ground water with an air stripper prior to discharge to the storm sewer. DAP also employed soil vapor extraction technology in an effort to remove the source of the VOC contamination. DAP has more recently performed field investigations designed to identify remaining VOC sources on their property. One possible source area was identified in the northern portion of their property and DAP will be required to initiate removal actions. DAP continues to operate the extraction wells. Compounds released include TCA, 1,4-Dioxane, Acetone, Cyclohexane, Dichloromethane (DCM), Lead, Manganese, Methyl Ethyl Ketone, N-Hexane, and Toluene. PCE, TCE, DCA, DCE, TCA, and DCA were detected at monitoring wells within the investigation area. Constituents detected in soil include TCE, 1,1,1 TCA, and toluene. TCE concentrations were detected in groundwater as high as 263 ug/l in 2004.

Gayston Corporation

Gayston Corporation, located at 55 Janney Road, is 2,600 feet northeast of DTP. Gayston Corporation formerly operated a metal parts manufacturing plant from 1962 to 1987. Various chlorinated solvents were used as degreasers to clean metal parts. In 1984, Ohio EPA inspected the site and noted the lack of regular inspections of the hazardous waste drum storage area and failure to maintain required documentation regarding storage of such wastes. In 1991, the City of Dayton installed seven ground water monitoring wells down gradient of the site. Analytical results of water samples collected from the wells revealed the presence of chlorinated solvents above maximum allowable drinking water standards. Subsequent sampling of soil and ground water underlying the site indicated the former Gayston facility was the source of the contamination. The site is located within the City of Dayton wellhead protection area.

In 1993 the Ohio EPA and Gayston Corp. entered into an Administrative Order on Consent in which Gayston Corp. agreed to perform an investigation of the extent of contamination and conduct remedial actions to control and remove the source(s) of chlorinated solvent contamination on their property. A remedial action consisting of soil vapor extraction and air sparging was implemented in 1994. The operation of the remedial action is ongoing.

Dayton-Phoenix Group, Inc.

Dayton-Phoenix Group (also known as Machine Control Systems), a 14 acre manufacturing plant located at 1619 Kuntz Road, produces electrical and locomotive components for the industrial and railroad sectors, as well as refurbishes motors and motor parts. The facility is located 1,700 feet northeast of DTP. During the period from 1991 to 2005, Dayton-Phoenix has reported releases of glycol ethers, lead, and copper.

Hollander Industries

The Hollander Industries site, located 2,800 feet east of DTP at 219 Kelly Avenue, is an abandoned aluminum foundry where 10 drums of solvents and cadmium waste were removed during clean up activities conducted from June to September 2000 under CERCLA. Hollander is listed as a large generator of hazardous wastes. The Hollander site lies 3,000 feet to the east (sidegradient) and slightly upgradient of DTP.

Commerce Park Drive Investigation Area

Commerce Park Drive investigation area is located 2,800 feet northeast of DTP. Groundwater samples collected from 1991 to 1997 during the Commerce Park Drive investigation had detected concentrations of PCE, TCE, 1,2-DCA, 1,2-DCE, 1,1-DCE, 1,1,1-TCA, 1,1,-DCA and 1,1,1,2-TCA.

Other Industries

- Dayton Wire Products
- Hyland Machine Co.*
- Neff Folding Box Co.
- Cordage Packaging*
- Commercial Metal Fabricators Inc.*
- Air City Models and Tools Co.*
- Precision Metal Fabrication
- Select Tool and Die Corporation aka Select Industries Corp Plants 1 & 2
- Dayton Clutch and Joint Inc.
- Wise Garage Inc.

*Indicates those facilities that lie within the Commerce Park Drive Investigation Area.

4.2.2 DTP Plant and Adjacent Source Areas

Dayton Thermal Products

Initial remedial activities were initiated in 1998. Areas requiring remediation were identified and both soil vapor extraction (SVE), and on-site in situ bioremediation and groundwater containment are being utilized at the DTP site to remediate the on-site constituents and prevent further off-site migration of these constituents. The current remediation system has significantly reduced constituent concentrations in groundwater at the DTP plant and effectively and contains constituents at the southern plant property line, as documented by the extensive sampling of the monitoring well network.

Soil impacts at the plant and the potential for the migration of constituents in the subsurface to groundwater have been mitigated by the design, construction, and operation of a SVE remediation system. The initial SVE system, installed in Building 40B in 1999, was comprised of 12 vapor extraction points.

In 2003, previously identified soil constituent source areas were further characterized as part of additional SVE field pilot-scale testing. Pilot-scale testing at 17 suspected source areas identified and confirmed potential soil impacts within a 25- to 50-foot radius of influence at some of the vapor extraction points.

Following these activities, the SVE system was modified to remediate the entire source area with the SVE well points and included the following:

- Installing the SVE extraction points at regularly spaced intervals based on the radius of influence measured during the SVE pilot-scale testing and operation of the existing SVE system;
- Installing extraction points screened near the capillary fringe to promote potential hot spot remediation;
- Evaluation of constituents at individual extraction points to map the distribution of constituents within the primary constituent source area;
- Designing a flexible system to accommodate the initial removal of constituents over a wide area and long term focused remediation at the capillary fringe and hot spots; and,
- Designing an expandable system to remediate constituents delineated outside the primary constituent source area, if necessary.

The SVE system is designed as two independent units. Each unit is capable of extracting up to 1000 scfm and consists of independently-operated banks of up to 10 SVE well points removing between 80-110 scfm from the subsurface. The well banks are cycled over a 24-hour period, activated by pneumatic valves set by timers. A total of 117 soil vapor extraction well points are located within the buildings and in the outdoor parking and logistics areas. A map of the extraction well points and the two SVE units is provided in Figure 4-4.

The upgraded SVE system operated from October 2003 to December 2005, and successfully removed 900 pounds of CVOCs from the vadose zone. The system is currently operated on a periodic basis to confirm that vadose zone concentrations have not rebounded.

The groundwater remediation system includes four extraction wells, each capable of pumping 100 gpm, which provide containment of the constituents at the southern property boundary. Seven injection wells deliver up to 400 gpm of untreated groundwater augmented with an organic carbon substrate (sodium lactate) to promote dechlorination. A net groundwater loss in the treatment area is maintained through use of an air stripping system capable of treating up to 200 gpm from the extraction wells. Water treated through the air strippers is discharged to a NPDES permitted outfall. The groundwater remediation system extraction wells are currently operating at 200 gpm (total) to maintain containment. Approximately 100 gpm is diverted to the air strippers and 100 gpm is augmented with lactate and re-injected, at less than half the allowable levels under the OEPA Class V Underground Injection Control Permit, to continue the reductive dechlorination process. The in situ groundwater treatment system has operated from June 2004 to present and successfully removed or dechlorinated 1365 pounds of CVOCs from the groundwater, through December 2005. The layout of the groundwater remediation system is presented on Figure 4-5.

Groundwater sampling to monitor system performance began in November 2003, before system operations began, and has continued quarterly through the present. Operation of the remediation system began in June 2004. Groundwater monitoring results indicate a significant decrease in the overall PCE and TCE concentrations (up to 60% reduction in some wells). In addition, increases in cDCE and vinyl chloride have occurred, indicating that reductive dechlorination of the source CVOCs is occurring. The increased presence of ethene in the area of the injection wells indicate that the complete reduction pathway is being achieved. Groundwater monitoring also shows an increasingly diverse microbial community as a result of substrate addition and changing groundwater conditions.

Gem City Chemicals, Inc.

Gem City Chemicals, Inc., located at 1281 Air City Avenue, is a chemical distribution, blending, and repackaging facility that has been in operation for over twenty years. Gem City Chemicals is located adjacent to DTP along the east property boundary. A release of chlorinated compounds was reported to the USEPA in 1987. On-site contaminants detected include Dichloroethane (DCA), PCE, TCE, TCA, and DCE. Ohio EPA became aware of VOC contamination in ground water at the facility in 1989 during a regional investigation of the sources of VOC contamination in Roehers Island (Mad River) Well Field. On July 6, 1992, Ohio EPA and Gem City Chemicals entered into an Administrative Order on Consent in which Gem City Chemicals agreed to prevent further off-property migration of VOC-contaminated ground water.

Currently a single recovery well is in operation, capturing and pumping contaminated ground water into an air stripper for treatment. Gem City Chemicals has an NPDES permit to discharge the treated ground water. Gem City Chemicals is required to continue to operate the recovery well until ground water clean-up goals are attained.

The groundwater constituents associated with Gem City Chemicals are upgradient to DTP (northeast). Prior to operating the groundwater extraction remediation system to reduce off-site constituent migration, contaminated groundwater from Gem City Chemicals likely migrated to the southwest beneath DTP and potentially further downgradient. CVOCs have been monitored and detected at groundwater monitoring wells installed on Gem City Chemical property since 1988. Groundwater samples collected in December 2006 detected concentrations of 1,1-DCA, PCE, 1,1,1-TCA, TCE, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, and chloroform.

Hohman Plating & Manufacturing Company

Hohman Plating & Manufacturing Company (Hohman), located 350 feet east of DTP at 814 Hillrose Avenue, was founded in 1918 and has since grown to be among the top five percent of metal finishing companies in the country. Hohman electroplates and metal-finishes for industries in the airline, automotive, medical, heating and cooling, laser and printing sectors. The facility consists of 15 electroplating lines, an R&D laboratory, a Quality Assurance Inspection laboratory, a Division of Environmental Safety that includes a wastewater treatment facility, and the Vacuum and Plasma Coatings Division. Hohman has reported hazardous waste releases to the USEPA from 1987-2005, with solvents being released between the years of 1989 and 1992. The list of reported constituents includes 1,1,1-TCA, TCE, cadmium compounds, chromium compounds, copper compounds, cyanide compounds, hydrochloric acid, hydrogen fluoride, lead, lead compounds, nickel compounds, nitrate compounds, nitric acid, sodium hydroxide, sulfuric acid, zinc compounds.

4.2.3 Source Areas South of Site

Potential source areas south of DTP were identified based on the location of large and small quantity generators, 2003 constituent distribution map (Figure 4-3), and the OEPA file review. A summary of each of these facilities and their impact on the extent of the Behr VOC Plume is presented below.

ARAMARK Uniform & Career Apparel, Inc.

Aramark Uniform & Career Apparel, Inc. (Aramark), formerly Aratex Services Inc. (Aratex), owns and operates an industrial laundry facility at 1200 Webster Street, approximately 1000 feet downgradient (south) of the DTP property. Operation and use of dry cleaning equipment and solvents were ceased at the site in 1987. During the removal of three underground tanks in 1991, PCE and TCE were identified in the soil surrounding the tanks. A subsurface investigation and groundwater monitoring were conducted to determine the nature and extent of contamination (DePaul and Associates, 1993). Chlorinated compounds were detected in soil samples to depths of 15 feet below ground surface. PCE, TCE, trans-1,2-dicholorethene (DCE) and TCA were detected in three monitoring wells. Groundwater sampled from another well on-site had TCE, DCE, TCA, ethyl benzene, toluene, and xylenes detections. A soil vapor extraction/ air sparge system was installed in 1996 to inhibit the migration of PCE, TCE, and DCE from the constituent source area to the underlying groundwater (Wetlands Company, 2003). The Behr VOC Plume is commingled with the Aramark Services Inc. plume from the point downgradient of the Aramark source area.

The SVE/AS system and the groundwater monitoring well network were decommissioned following the cessation of operation on November 19, 2003. Environmental reports regarding the Aramark investigation and remediation efforts are presented in Attachment 4-B.

Environmental Processing Services

Environmental Processing Services is a RCRA permitted treatment and storage facility located at 416 Leo Street, located 2,400 feet east of DTP. The facility consists of a centralized wastewater treatment area, a used oil recycling area, and a nonhazardous solids solidification area. Hazardous waste accepted under the RCRA permit is typically drum waste, which is bulked and sent off as a fuel, for incineration or stabilization. Wastewaters accepted at the facility include hazardous and nonhazardous wastewaters, which are treated by ultra filtration, metals precipitation and biodegradation, including a biological wastewater process. Compounds reported as released during 1987 to 1988 are as follows: TCA, acetone, DCM, freon 113, methyl ethyl ketone, PCE, toluene, TCE, and xylene (mixed Isomers).

4.3 LMMRB CONSTITUENT DISTRIBUTION AND MIGRATION

Information on groundwater flow and constituent source areas located within the LMMRB were evaluated together to further define the Behr VOC Plume. Groundwater flow was used to identify potential source areas both upgradient and downgradient of the DTP site that could contribute to the Behr VOC Plume. These source areas were then evaluated for consistency with groundwater flow patterns and used to further identify contributors to the TCE plume detected in the DTP area. Results of this evaluation indicate that there are several contributors to the Behr VOC Plume both up and downgradient of the site. The idea of a "Behr VOC Plume" is misleading as it is likely that all areas within the Behr VOC Plume are also impacted by other plume(s). The identification of these commingled plumes is discussed further below.

4.3.1 North of DTP

A comprehensive investigation and evaluation of constituent distribution in the upper portion of the LMMRB has not been completed. Available groundwater quality data from sites located in the upper portion of the basin have been integrated with the data for the middle and lower basin to aid in defining the Behr VOC Plume area. A depiction of constituent distribution present in the upper, middle, and lower LMMRB is presented on Figure 4-3. As shown on Figure 4-3, a significant plume of TCE and TCA extends northeast from near the Miami River to the southwest to commingle with the constituents detected at Gem City Chemicals. An isolated PCE plume is also present near the Gayston facility. Additional groundwater flow and constituent distribution information would be required to refine the constituent distribution depicted in Figure 4-3.

The groundwater movement north of the DTP site is complex due to upper aquifer recharge and pumping at the Miami River and Rohrers Island (Mad River) Well Fields, regional groundwater flow at the confluence of the Miami and Mad River buried valley aquifers, and the localized affects associated with groundwater remediation system pumping centers. As a result, constituent distribution and migration likely reflects the predominant groundwater flow pattern with the overall width of the plume increased due to intermittent, variable groundwater flow direction. Changes in the groundwater flow gradient over time from municipal well field pumping, aquifer recharge, and local pumping centers will also affect the rate of constituent migration from the source area.

The regional groundwater flow immediately north of the DTP site is generally to the south-southwest. Small areas of local groundwater flow variations exist; however, these variations likely do not result in a northerly flow of groundwater constituents from the DTP site. This assessment is supported by:

1. Groundwater measurements at the Gayston Corporation Site.
2. Groundwater measurements and contaminant movement at the DTP site.
3. Regional groundwater conditions, elevations and documentation.

Public documents associated with the remediation system at the Gayston Corporation site located to the north of the DTP site identify regional south-southwesterly flow in the vicinity of the Gayston Corporation property. The Great Miami River north of the DTP may influence groundwater flow direction in the vicinity of the river; however, the Gayston Corporation south-southwesterly flow data demonstrate that the extent of that influence near the river is limited. Groundwater flow data at the Gayston Corporation site also shows that extraction-impacted flow directions range from west (toward the Great Miami River) to north (toward the municipal well fields); however, in the absence of extraction-influence, regional flow is south-southwest.

Pressure transducer groundwater elevation information also substantiates that groundwater (and constituent) flow north of the DTP is to the south-southwest. This flow direction, consistent since 2003, suggests the groundwater flow direction stabilizes to a south-southwest flow direction with increased distance from the Miami River and Rohrers Island well fields, and groundwater remediation systems located to the north. How and where the groundwater flow system stabilizes is undetermined. A transition zone or groundwater divide may be present that would shift north-south depending on the hydraulic conditions. During times of drought when recharge to the upper aquifer is low and pumping rates are high, the divide would likely migrate to the south, expanding with the radius of influence of the Miami Well Field. During times of high aquifer recharge, the radius of influence of the well field would be reduced, and the groundwater divide would migrate back to the north. The affects this would have on the historical or current distribution and migration of constituents is difficult to predict.

Figure 4-3 depicts that a significant area of impacted groundwater from a wide range of potential source areas is present north of Gem City Chemicals and is likely migrating to the south-southwest. This indicates that groundwater beneath the DTP is likely impacted from upgradient sources and that at least a portion of these upgradient plumes flow beneath the DTP site and that the distribution of these constituents have been influenced by activities by others. DaimlerChrysler is working with the City of Dayton to install additional pressure transducers to monitor groundwater flow characteristics north of DTP to document the flow direction and migration pathway upgradient of DTP.

4.3.2 DTP Plant and Adjacent Source Areas

In 2003 a comprehensive evaluation of the regional groundwater flow and constituent distribution was performed in the middle and lower LMMRB to assist in establishing the horizontal and vertical extent of off-site groundwater constituents associated with DTP. The plume delineation effort, discussed in Section 2.4, included a MIP/EC Geoprobe® investigation at 67 locations to evaluate the vertical distribution of VOCs and stratigraphy prior to the collection of up to three representative groundwater grab samples. The results of this field investigation, combined with existing DTP permanent groundwater monitoring network sample results and groundwater quality data from other facilities, allowed construction of the comprehensive groundwater quality depiction within the middle and lower portion of the basin presented in Figure 4-3.

The Gem City Chemicals groundwater remediation system is comprised of one 300 gpm on-site groundwater extraction well which has been operational since 1992. The radius of influence of the well is apparent on Figure 3-6. As shown, the radius of influence extends southwest to the DTP property.

Prior to the operation of the Gem City Chemicals extraction well, the migration pathway for constituents released from Gem to groundwater would have followed the established south-southwest groundwater flow direction and migrated beneath DTP. This migration pathway resulted in the Gem City Chemical plume becoming commingled with the DTP constituents along the south-southwest groundwater flow path extending beneath DTP. Once commingled, the horizontal and vertical extent the Gem City Chemical constituents cannot be determined.

The groundwater constituents TCE and TCA, located east of DTP and south of Gem City Chemicals, tend to follow the established southwest groundwater flow direction. These constituents appear to originate at a source area northeast of DTP. The strong west to southwest groundwater flow precludes the easterly migration of constituents from DTP, further indicating that constituents from a northeast source area are detected east of the DTP plant.

In addition, the influence of the Gem groundwater extraction system on the movement of the Behr VOC Plume is not significant based on the radius of influence of the Gem system, the constituent levels noted at the Gem site, and the distribution of constituents. The radius of influence of the Gem well, the constituent levels east of the DTP property line (which are of the same order of magnitude as the rest of the Gem site), and the distribution of PCE, all indicate that the Behr VOC Plume has not migrated substantially to the east. Given the minor influence that the Gem system has had on the Behr VOC Plume, and the natural flow directions in the area, it is likely that the residual constituents east of the DTP site are attributable to the releases at the Gem site and other source areas located to the north.

Holman Plating and Manufacturing is located 350 feet west of DTP. Low concentrations of TCE are present along the west DTP property boundary. Groundwater samples results from wells located south and west of DTP, perpendicular to the groundwater flow, indicate substantially higher concentrations of TCE farther from the property line. These wells, located along a southerly flow path beneath Holman Plating suggest an unidentified constituent source west of DTP.

4.3.3 South of DTP

Regional groundwater (and hence constituent) migration south of DTP is to the south-southwest. This conclusion is clearly supported by the middle and lower LMMRB groundwater measurements and data collected prior to the installation of the DTP groundwater containment system and outside the radius of influence of the Gem City Chemicals extraction well.

The constituent distribution for TCE, 1,1,1 TCA, and PCE concentrations above the MCL and the groundwater flow direction is presented on Figure 4-3. These constituent distribution maps provide insight into the constituent migration with groundwater flow and potential constituent source areas. The location and surface water elevation of the Miami and Mad Rivers and the associated regional groundwater flow direction within the LMMRB dictates the constituent migration pathway downgradient from potential source areas.

The naturally occurring LMMRB groundwater flow is roughly divided into a western section and an eastern section, along the north-south trend of I-75. Groundwater west of I-75 flows southeast from the Miami River Island Park Dam Impoundment before turning south toward the discharge point downstream of the dam. Groundwater east of I-75 flows predominantly south toward the discharge point downstream of the Miami River dam.

The groundwater flow direction, constituent concentrations detected, and the constituent migration pathways mapped west of I-75 preclude the former DTP plant as a source for groundwater constituents in that area. Specifically, the potential industry source areas located west of I-75 do not have the potential to commingle with the Behr VOC Plume until the constituents approach the LMMRB groundwater discharge point downstream of the dam.

The constituent distribution and migration to the south, downgradient of the DTP plant, encompasses a broad commingled constituent plume migrating from the northeast to southwest along the established groundwater flow path. The eastern portion of the plume includes contributions from the Gem City Chemicals constituent source, likely source areas located to the north of Gem City Chemicals, and Aramark as the plume migrates to the southwest. The central portion of the plume includes contributions from Gem City Chemicals prior to operation of their extraction well and the DTP constituent source. The western portion of the plume, located east of I-75 includes contributions from unidentified source areas immediately west of DTP potentially including Holman Plating, Paint America, and others.

Further to the south as the constituents approach the LMMRB discharge area, the broad plume is further commingled with constituent plumes located west of I-75 and an unknown source area located to the east. South of Keowee Street, constituent plumes within the lower LMMRB basin converge on the discharge area resulting in an extensive commingled plume of VOC groundwater contamination.

5. BEHR VOC PLUME DEFINITION AND CONCLUSIONS

The information and evaluations presented in the preceding sections of this Report allow the demarcation of the boundary of the removal action area to be addressed under the AOC. As previously noted, the definition of the removal action area is important to implement an appropriate DaimlerChrysler response to indoor air TCE concentrations in excess of applicable screening levels. DaimlerChrysler will conduct Phase II indoor air investigations within this boundary.

5.1 PRELIMINARY PLUME DEFINITION

The AOC entered into between DaimlerChrysler and the U.S. EPA includes a definition of the "Site" to be addressed under the AOC. That definition states as follows:

> j. "Site" shall mean the Behr VOC Plume Superfund Site, encompassing the areal extent of the undefined groundwater contamination plume originating from the Behr-Dayton Thermal Systems LLC facility (the Behr-Dayton facility) located at 1600 Webster Street, Dayton, Montgomery County, Ohio, and a residential area south of the Behr-Dayton facility, including but not limited to Daniel Street, Lamar Street, and Milburn Avenue and depicted generally on the map attached as Attachment B.

The residential area south of the DTP plant bounded by Daniel Street, Lamar Street, and Milburn Avenue is being addressed in accordance with the approved Phase I Work Plan. During a March 12, 2007 meeting, the U.S. EPA agreed that the area identified in Figure 5-1 served as an initial representation of the boundary of the removal action area to be addressed under the Phase II Work Plan.

5.2 FINAL PLUME DEFINITION

Since the March 12, 2007 meeting, DaimlerChrysler has obtained additional data from public records and conducted additional evaluation of groundwater flow and constituent patterns to better define the boundary of the removal action area. The final defined removal action area is shown on Figure 5-2. It is bounded on the north by Stanley Avenue (i.e., the northern property boundary), on the south by Keowee Street, and on the east and west by groundwater flow lines that dictate the lateral limits of DTP constituents. The information, analytical data and analyses used to establish the final boundary of the removal action area to be addressed under the AOC are described throughout this Report and are summarized below.

Groundwater movement from the DTP property is limited within the flow contours shown on Figure 3-8. The locations and pattern of groundwater constituents identified in the vicinity of the DTP property support the groundwater flow movement described above and the final demarcation of the removal action area boundary. The prevalence of groundwater constituents unrelated to the Behr VOC Plume demonstrates that releases of VOC contaminants have occurred from other sources in the general vicinity of the DTP plant. These releases have resulted in a Behr VOC Plume that is likely entirely commingled with groundwater constituents from those other sources.

- West: Groundwater flow lines bound the western extent of the Behr VOC Plume. The south-southwesterly groundwater flow in the near vicinity of the DTP site precludes the Behr VOC Plume constituents from migrating to the west. The well-defined flow regime in the southwestern portion of the basin precludes the Behr VOC Plume from migrating to the west side of I-75. The isolated PCE plume to the west of the DTP property, east of I-75, is indicative of a separate release (potentially associated with Hohman Plating or Paint America). The distribution of constituents support the western boundary defined by the groundwater flow line.

- East: Groundwater flow lines bound the eastern extent of the Behr VOC Plume. The south-southwesterly groundwater flow in the near vicinity of the DTP site precludes the Behr VOC Plume constituents from migrating to the east. Known sources of VOC groundwater constituents located to the east include the Gem City Chemicals Site. The distribution of constituents associated with Gem City Chemicals and the south-southwest groundwater flow support the eastern boundary defined by the groundwater flow line. The groundwater extraction system at Gem City Chemicals has likely influenced the movement of groundwater near the DTP property; however, the radius of influence of the Gem well, the constituent levels east of the DTP property line (which are of the same order of magnitude as the rest of the Gem site), and the distribution of PCE, all indicate that the Behr VOC Plume has not migrated substantially to the east.

- North: The northern boundary of the AOC area is defined by the property line based primarily on a likely groundwater divide to the north of the DTP site and the south-southwesterly flow direction on the DTP property (i.e., the DTP site is situated south of the groundwater divide, but the exact location of the divide is currently unknown).

Groundwater flows to the south-southwest. However, the groundwater extraction system at Gem City Chemicals has likely influenced the movement of groundwater northeast of the DTP property toward the Gem City Chemicals site. Other potential sources to the north, such as the Dayton-Phoenix Group (Machine Control Systems), Globe Motors Division of LC&S, Inc. and the Commerce Park investigation area (including Cordage Packaging, Gayston Corporation, and DAP Inc.) exist; however, insufficient data are currently available to accurately define current or historical groundwater flow direction and constituent migration from these sites.

- South: The operating extraction system at the DTP site currently prevents groundwater constituents from migrating beyond the property line of the DTP facility. Further downgradient, groundwater flow lines cannot be used to delimit the southern boundary. The extent of commingling serves as a basis for the final southern boundary of the AOC area. Beyond the defined southern boundary, the number of contributors is believed to be high as the groundwater constituents from other release sources funnel into a narrow area influenced by the rivers and dam. Therefore, DaimlerChrysler will, in accordance with the AOC, respond independently (at present) to the potential indoor air concentrations in excess of applicable screening levels within the Behr VOC Plume downgradient of the DTP plant, but north of the southern boundary line of the removal action area. To the extent response actions are warranted south of the removal action area, DaimlerChrysler will coordinate its actions with those of the other responsible parties. Those response actions are not included within the scope of the current AOC between DaimlerChrysler and the U.S. EPA.

This Report provides the U.S. EPA and the Ohio EPA with the source information, groundwater data, and scientific analysis to document a number of additional sources of the VOC groundwater contamination detected outside of the Behr VOC Plume within the LMMRB. This information should be used by the agencies to compel contributions (active participation, financial and/or strategic coordination) from other potentially responsible parties for the commingled areas.

5.3 CONCLUSIONS

A summary of the conclusions reached through the evaluation of data and additional information described in this report is presented in the following bullet list.

- The primary groundwater flow direction beneath and south of the DTP site is to the south-southwest and is influenced by the rivers and groundwater extraction systems in the area. Variations in groundwater flow direction occur; however, these variations are infrequent and of short duration. These variations do not impact the DTP groundwater constituent migration direction associated with the DTP site.

- The groundwater flow patterns north of the DTP site are not currently well defined. Data indicate that a groundwater divide occurs somewhere to the north or northeast of the DTP site. Groundwater south of that divide generally flows to the south-southwest, and groundwater north of the divide generally travels north toward the Great Miami River. To further define the location of the groundwater divide, DaimlerChrysler is assisting the City of Dayton in conducting a groundwater elevation and flow direction study using pressure transducers to collect continuous water level data to the north of the DTP site.

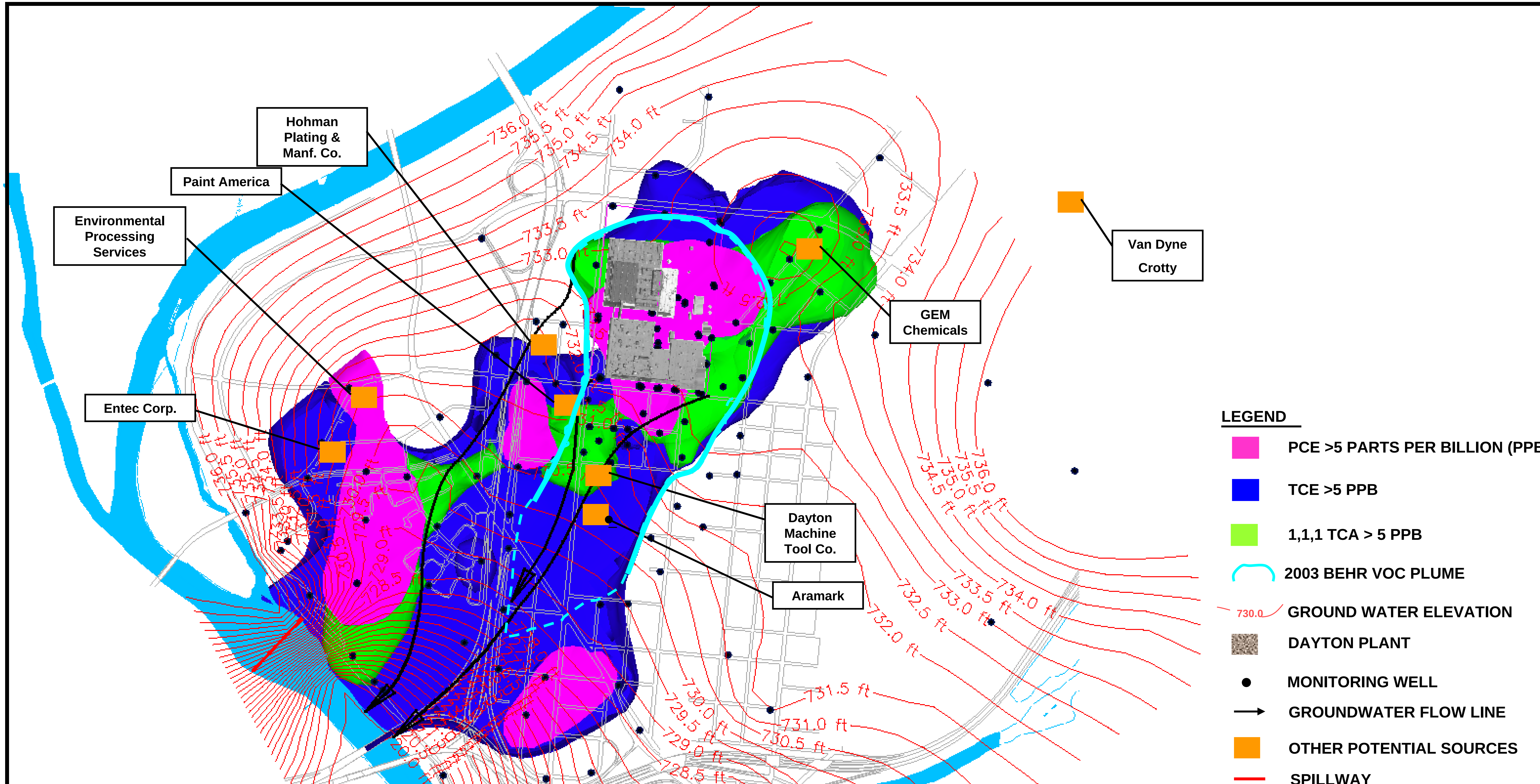
- Groundwater flow patterns indicate that groundwater constituents from upgradient properties are likely present beneath the DTP site, are currently being remediated as part of DaimlerChrysler's on-site groundwater containment and treatment activities, and likely have migrated south of the DTP site.

- Identified locations of DaimlerChrysler groundwater constituents are commingled with constituents from other releases in the vicinity of the DTP site.

- The defined removal action area to be addressed under the AOC is bounded as follows:
    - North – Stanley Avenue, i.e., the northern property boundary,
    - South – Keowee Street, and
    - East and West – Groundwater flow lines that define the lateral limits of DTP constituents.

- Public records searches have identified additional known and potential release sources of chlorinated solvents to the groundwater in the vicinity of the DTP site. Thus, historical DaimlerChrysler operations are not solely responsible for the presence of TCE in the groundwater in the area of the DTP site. It is incumbent on the U.S. EPA and the Ohio Environmental Protection Agency (Ohio EPA) to initiate the participation of other potentially responsible parties

These conclusions provide the basis to implement all response and removal actions required by the AOC. Since the boundary for all response actions required by the AOC has been defined, a Phase III investigation is not required. DaimlerChrysler will prepare and submit modifications to the Phase II Work Plan (previously submitted to the U.S. EPA and the Ohio EPA) to incorporate the removal action area defined in this report. Upon approval of the modifications, the Phase II investigation will be conducted. Subsequent to the receipt and analysis of Phase II investigation results, mitigation activities, if required under the AOC, will begin.



Earth Tech
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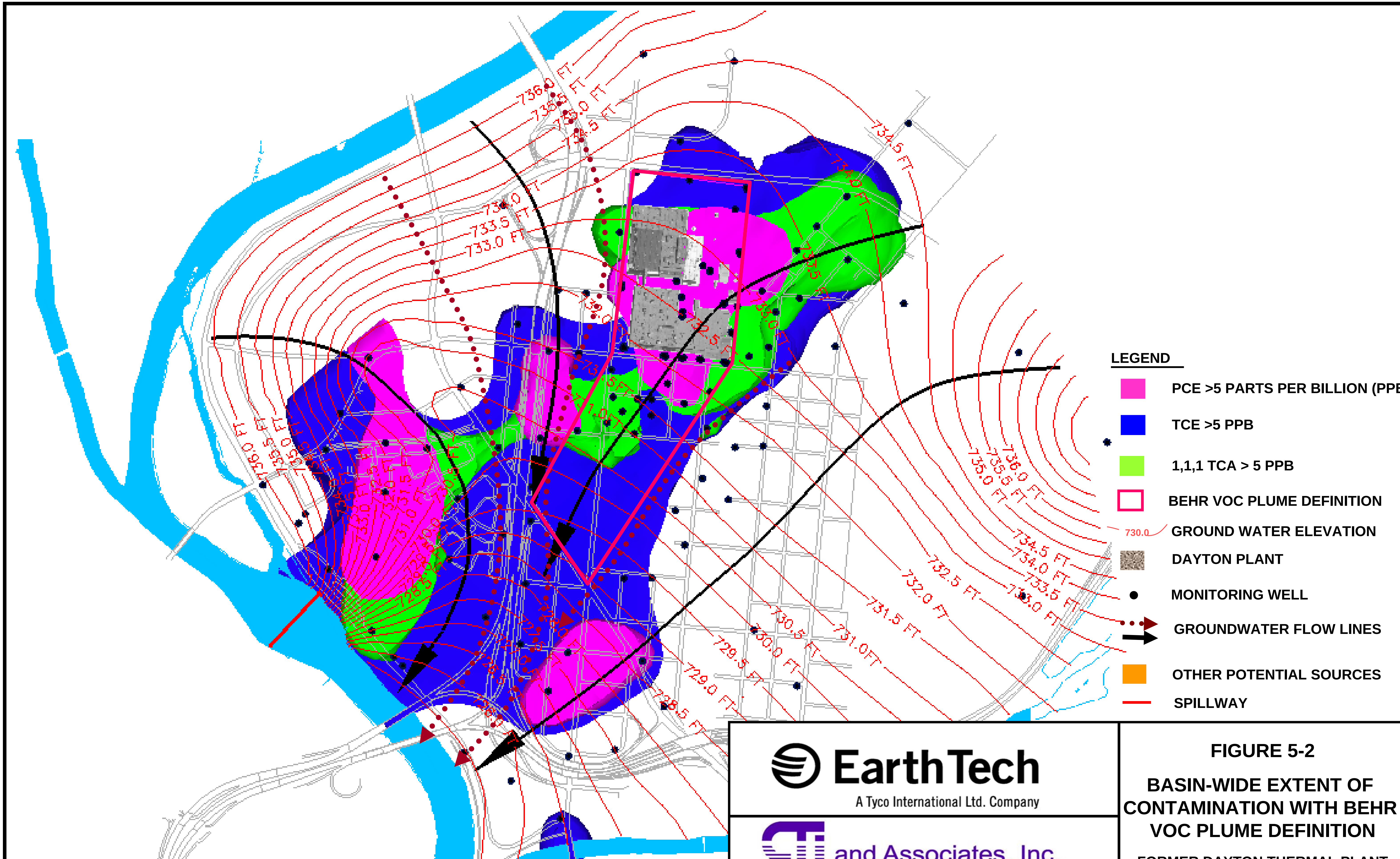
CTI and Associates, Inc.

FIGURE 5-1

2003 BEHR VOC PLUME

FORMER DAYTON THERMAL PLANT
DAYTON, OHIO

APRIL 2007 98809



Earth Tech
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CTI and Associates, Inc.

FIGURE 5-2

BASIN-WIDE EXTENT OF CONTAMINATION WITH BEHR VOC PLUME DEFINITION

FORMER DAYTON THERMAL PLANT
DAYTON, OHIO

APRIL 2007 98809

ATTACHMENT D
PHASE II WORK PLAN

PHASE II WORK PLAN FOR BEHR VOC PLUME SITE DAYTON, OHIO

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March 23, 2007
Revised by Chrysler on October 26, 2007
Modified and Approved by U.S. EPA on November 6, 2007

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1. BACKGROUND

Chrysler LLC (Chrysler), formerly known as DaimlerChrysler Corporation (DCC), has prepared this Phase II Work Plan for Indoor Air Sampling, Delineation, and Mitigation to determine if trichloroethylene (TCE) vapors are migrating into properties proximate to the Behr Dayton Thermal Products Facility located at 1600 Webster Street in Dayton, Ohio (Behr-Dayton facility). This work is being performed pursuant to an Administrative Order by Consent (AOC) effective date December 19 2006, between U.S. EPA and Chrysler. This work plan addresses the "Site", identified in the AOC as the area underlain by the undefined groundwater contamination plume originating from the Behr-Dayton facility. The investigation activities are related to a trichloroethylene (TCE) contaminated groundwater plume which has migrated south-southwest of the Behr facility and beneath the properties mentioned above. Groundwater in this area is located approximately 20 feet below ground surface (bgs).

Behr Dayton Thermal Systems LLC is a Delaware limited liability company which currently owns and operates the Behr Dayton facility. Behr Dayton Thermal Systems LLC manufactures vehicle air conditioning and engine cooling systems at the facility.

Chrysler is a Delaware corporation that owned and operated the Behr Dayton facility from at least 1937 through April of 2002. Chrysler manufactured air conditioning equipment at the Behr Dayton facility. During Chrysler’s ownership of the Behr Dayton facility, hazardous substances, including trichloroethene (TCE), were released at and from the Behr Dayton facility.

Earth Tech has conducted quarterly monitoring on a network of 75 on-site and off-site groundwater monitoring wells since 2001. In 2003, the following monitoring wells were sampled and contained elevated levels of TCE: MW010s (17,000 parts per billion (ppb)), MW028s (9,600 ppb), and MW029s (16,000 ppb). These monitoring wells are located along the southern perimeter of the Behr Dayton facility (MW010s) or in the adjacent neighborhood (MW028s and MW029s). The Maximum Contaminant Level (MCL) of TCE is 5 ppb. In July 2007, Earth Tech conducted the most recent groundwater sampling event in conjunction with the Ohio EPA and City of Dayton. Results from that sampling event indicated that concentrations had changed as follows: MW010s had increased to 19,000 ppb and MW028s had reduced to 3,200 ppb. In addition, MW029s was destroyed prior to the July 2007 sampling event, and MW038s, which is located at the intersection of Daniel Street and Lamar Street (residential area south of the Behr

Dayton facility), increased from 670 ppb TCE in 2003 to 5,600 ppb TCE in 2007.

Chrysler contracted Earth Tech to design, install, and operate two systems for the remediation of soil and groundwater contamination under the Behr Dayton facility. Earth Tech installed a soil vapor extraction (SVE) system on the site for soil remediation and began operation in October 2003. The system was operated through December 2005, and restarted in March 2007. Based on extracted air concentrations, the SVE system removed a total of approximately 1000 pounds of VOCs. Earth Tech installed a groundwater remediation system on the site and began operation in June 2004. Through December 2005, the groundwater system had removed a total of 1031 pounds of VOCs, and dechlorinated 325 pounds of VOCs.

Under the AOC, Chrysler previously conducted the following activities under a Phase I Work Plan dated January 26, 2007 approved by the U.S. EPA:

a) Developed and implemented a Site Health and Safety Plan, including an Emergency Contingency Plan.

b) Conducted sampling of subsurface soil gas within 19 residential properties bounded by the following geographic area: Leo Street to the north, Lamar Street to the south, Webster Street to the west, and Milburn Avenue to the east.

c) Installed interior TCE vapor abatement systems in 15 residential structures impacted by TCE where the applicable Indoor Air Screening Level for TCE was exceeded. Abatement systems include installation of a sub-slab vapor removal system, sealing cracks in walls and floor of the basement, and/or sealing or fixing drains that could be a pathway.

d) Developed and implemented a vapor abatement system performance sampling plan to confirm that the applicable Indoor Air Screening Level is achieved for TCE following installation of the TCE vapor abatement systems. Work under Phase I will not be completed at any structure until quarterly monitoring (4 continuous quarters) for indoor air is documented to be less than the applicable screening levels, following the termination of the TCE vapor abatement system operation.

A copy of the AOC is included in Attachment A.

2. SITE MOBILIZATION

2.1 HEALTH AND SAFETY PLAN

A Health and Safety Plan (HASP) has been established for the Chrysler Phase II area. The HASP provides specific guidelines and establishes procedures for the protection of Chrysler personnel and its contractors during the investigation and system installation activities planned at the residential properties. The HASP is based upon existing data. HASP procedures will be updated if additional information is discovered which requires alteration of the plan. The HASP is included as Attachment B.

2.2.1 EMERGENCY CONTINGENCY PLAN

An **Emergency Contingency Plan** (ECP) has been established for this site. The ECP provides specific guidelines and establishes procedures for the protection of personnel in the event of an emergency. The ECP is included as Section 9.0 of the HASP. As part of the ECP process, an update meeting will be held with local fire department and EMS personnel no more than 10 days after approval of this Work Plan.

3. QUALITY ASSURANCE PROJECT PLAN

A Quality Assurance Project Plan (QAPP) has been prepared to ensure data collected during the investigation phase is reliable. A copy of the QAPP is included as Attachment C.

4. DATA REVIEW AND SAMPLING PLAN

This Work Plan addresses indoor air delineation within the area of the Behr VOC Plume in Dayton, Ohio. Pursuant to the results of the Chrysler and Ohio EPA 2007 groundwater sampling event and U.S. EPA's sub-slab sampling in May and June 2007, the following steps are proposed under this Work Plan:

a) Determine sub-slab TCE concentration levels in residential, commercial and industrial properties within the Behr VOC Plume area.

b) Determine indoor air TCE concentrations in residential properties where sub-slab concentrations exceed the TCE sub-slab screening level, and in commercial and industrial properties, as needed, within the Behr VOC Plume area.

c) Install sub-slab depressurization systems (SSDSs) where indoor air TCE concentrations exceed the applicable TCE Indoor Air Screening Levels for the type of property sampled, i.e. residential, commercial/community, or industrial.

d) Develop and implement a SSDS performance sampling plan to confirm that applicable Indoor Air Screening Levels are achieved for TCE following installation of the TCE SSDS.

4.1 GROUNDWATER INVESTIGATION - 2007

In July 2007, Ohio EPA conducted the most recent groundwater sampling event in conjunction with Chrysler and the City of Dayton. Ohio EPA results from the sampling event indicated the following groundwater monitoring wells exceeding the TCE MCL of 5 ppb:

MW-18S – 45 ppb	MW-37S – 23 ppb	G-4 – 190 ppb
MW-28S – 3,200 ppb	MW-39S – 530 ppb	MW-6S – 75 ppb
MW-32S – 110 ppb	MWA-004 – 680 ppb	MW-5D – 50 ppb
MW-D103 – 8.9 ppb	MWA-006 – 8,100 ppb	MW-5M – 280 ppb
TW-16 – 130 ppb	MWET-04S – 28 ppb	MW-5S – 7.4 ppb
TW-3 – 1,100 ppb	MWET-03S – 41 ppb	MW-D10 – 65 ppb
TW-4 – 8.1 ppb	MW-D101 – 440 ppb	MW-007S – 14 ppb
TW-5 – 620 ppb	AC-3 – 26 ppb	MW-008S – 200 ppb
TW-6 – 720 ppb	AC-4 – 110 ppb	MW-10S – 19,000 ppb
TW-8 – 140 ppb	MW-68S – 110 ppb	MW-11S – 170 ppb

MW-67S – 50 ppb	AC-1 – 180 ppb	MW-24S – 61 ppb
MW-34S – 35 ppb	AC-2 – 140 ppb	MW-25S – 9.7 ppb
MW-35S – 440 ppb	WC-2 – 26 ppb	MW-38S – 5,600 ppb

See Figure 1 for the 2007 Ohio EPA Shallow Groundwater Summary Map.

Groundwater monitoring well TW-6, which is the only groundwater well located south of VanCleve Elementary School in Figure 1, showed a TCE concentration of 720 ppb. In 2003, monitoring well TW-6 showed a TCE concentration of 200 ppb.

4.2 SOIL GAS SAMPLING – MCCOOK FIELD NEIGHBORHOOD

In May and June of 2007, the U.S. EPA collected sub-slab and indoor air samples from 30 locations, including 8 residential locations within the McCook Field Neighborhood south of VanCleve Elementary School (South McCook Field Neighborhood [SMFN]). A total of 4 residential locations within SMFN showed sub-slab TCE concentrations greater than the ATSDR and ODH TCE screening level of 4 ppbv (EPA-14, EPA-18, EPA-29 and EPA-38), with a maximum TCE concentration of 1,000 ppb at EPA-29. A total of 2 residential locations within SMFN showed indoor air TCE concentrations greater than the ATSDR and ODH TCE screening level of 0.4 ppbv (EPA-22 and EPA-39), with a maximum TCE concentration of 0.96 ppbv at EPA-22. The U.S. EPA Sampling Summary in SMFN is found in the yellow-shaded area of Figure 2. Results of the U.S. EPA sampling confirmed that TCE vapor intrusion is occurring within the SMFN, requiring additional sampling and mitigation. In addition, results of the U.S. EPA sampling documented a potential for vapor intrusion at Kiser Elementary, which requires additional quarterly sampling.

4.3 SUB-SLAB AND INDOOR AIR INVESTIGATION

A combination of indoor air sampling and subsurface slab air sampling will be conducted. Chrysler will sample specific properties within the blue-shaded area shown in Figure 3. A table of the properties, including a description of the property use (ie. residential, commercial, industrial) is included in Attachment D. Private property sampling will continue within the Behr VOC Plume extent, as necessary based on indoor air sampling results. The samples will be analyzed for TCE utilizing U.S. EPA Method TO-15. These samples will be used to determine if a SSDS is necessary. The sampling procedure and methodology are detailed in the following sections.

Due to the threat to public health, in November 2007, the U.S. EPA initiated sub-slab and indoor air sampling at specific residential properties within the yellow-shaded area shown in Figure 4. The U.S. EPA will also complete quarterly air sampling at the Kiser Elementary School.

4.3.1 ACCESS REQUESTS

To ensure “best efforts” are made to gain access to the properties noted above, the following steps will be taken to request access:

1) Mailing – A mailing will be delivered to each property owner and occupant listed (in Attachment D) outlining the issues noted in the neighborhood and requesting access to complete the work that needs to be completed. The mailing will include contact information and a brief discussion of sampling activities to be conducted.
2) Visit – Within 10 days of the mailing, if there is no response to the mailing or if access is denied, the Montgomery County Health Department (MCHD) and/or Chrysler personnel will attempt to contact the occupants and/or property owner in person.
3) Certified Letter – Within 10 days of the site visit, if attempts to contact the occupant/owner in person are unsuccessful or if access is denied, a certified letter will be mailed to the occupant and owner outlining the work to be completed.
4) Certified Letter #2 – If there is no response to the first certified letter or if access is denied within 10 days of receipt, a second certified letter will be mailed to the occupant/owner further encouraging that access be granted.
5) Notify U.S. EPA – In the event there is no response using the 4 steps above, or if access is denied, the U.S. EPA will be notified within 10 days that Chrysler’s “best efforts” to gain access to the property have been unsuccessful. U.S. EPA and the MCHD will assist with obtaining access agreements before agreeing to “Best Efforts”.

Contact with the occupants/owners will be documented and logged. A contact list similar to the example included as Attachment D will be used to log contact. In the event that an owner denies access, an attempt will be made by Chrysler to obtain a written signature on the access agreement noting that the owner is denying access.

4.3.2 RESIDENTIAL INDOOR AIR SAMPLING

One indoor air sample and one subsurface slab sample will be collected at residential properties and schools within the shaded area shown on Figures 3 and 4. The results from the samples collected from the residences and schools will be reviewed, and an SSDS will be installed if indoor air results exceed the residential TCE Indoor Air Screening Level of 0.4 ppbv, and the subsurface slab results exceed the subsurface slab residential TCE screening level of 4 ppbv.

In a case where the residential sub-slab screening level is exceeded, but the indoor air screening level is not exceeded, quarterly indoor air and sub-slab air sampling will be conducted for a period of one year. If the indoor air screening level is exceeded during the quarterly sampling, a SSDS will be installed. If the indoor air screening level is not exceeded during the quarterly sampling, no further action will be required.

4.3.3 INDUSTRIAL INDOOR AIR SAMPLING

One indoor air sample will be collected at industrial facilities within the blue-shaded area on Figure 3. The results from the samples collected from the industrial facilities will be reviewed, and an SSDS will be installed if indoor air results exceed the Occupational Safety and Health Administration (OSHA) permissible exposure level (PEL) of 100 ppm.

4.3.4 COMMERCIAL/COMMUNITY FACILITY INDOOR AIR SAMPLING

One indoor air sample will be collected at commercial and community facilities within the blue-shaded area shown on Figure 3. Community facilities include churches and publicly-owned properties available for public use. The results from the indoor air samples collected from the commercial/community facilities will be reviewed, and a sub-slab sample will be collected if indoor air results exceed the indoor air screening level of 1.7 ppb. If indoor air results exceed the indoor air commercial TCE screening level of 1.7 ppbv, and the sub-slab results exceed the sub-slab commercial TCE screening level of 17 ppbv, a SSDS will be installed. If a property has mixed use, the appropriate standard will be applied based on usage. Where areas of use are not separate, the more stringent standard applies.

In a case where the commercial/community facility sub-slab screening level is exceeded, but the indoor air screening level is not exceeded, quarterly indoor air and sub-slab air sampling will be conducted for a period of one year. If the indoor air screening level is exceeded at any point during the quarterly sampling, a SSDS will be installed. If the indoor air screening level is not exceeded during the quarterly sampling, no further action will be required.

4.4 SAMPLING PROTOCOL

4.4.1 SAMPLE TYPES

Subsurface Slab Samples

One subsurface slab sample will be collected from each residential and school property and select industrial/commercial/community properties.

Indoor Air Samples

One indoor air sample will be collected from each property.

Blank Sample

One blank canister will be submitted to the laboratory in each week that indoor air samples are collected as a trip blank. Canisters will be transported from the laboratory to the field and returned to the laboratory with other analytical samples.

Ambient Air Sample

One ambient air sample will be collected on each day that indoor air sampling is conducted. The location of the ambient air sample will be outdoors, upwind of the area being sampled.

Co-located Sample

One co-located sample will be collected from an indoor air sample location. The sample ports will be placed side by side.

4.4.2 INFORMATION ACQUISITION

Various types of information will be obtained and recorded for the purposes of this evaluation. Data/information forms to be used are listed below.

- Canister Data: Data on the condition of the canisters, sampling times, vacuum, etc. will be recorded in the Field Book, as necessary.
- Property Information Form: Used to record site specific information about property

features that may help in the interpretation of the analytical data (Attachment E), including photographic documentation.

- Occupant Questionnaire: Used to record information that may provide insight into sources of chemicals within the property that may be detected in the air samples (Attachment F.
- Indoor Air Testing Instructions: Instructions will be provided as information to occupants regarding the steps that should be taken to help ensure the integrity of the air samples (Attachment G).

4.4.3 SAMPLING METHODOLOGY

Sampling methodology will be consistent with U.S. EPA protocols for the collection of air samples using TO-15 Summa™ canister sampling and analysis methodology (U.S. EPA 1999) or U.S. Occupational Safety and Health Agency (OSHA) protocols for the collection of TCE air samples using OSHA Method 1001 charcoal tube methodology (U.S. OSHA, May 1999). Sampling for each air sampling type is discussed below. Each canister will be certified cleaned by the selected laboratory according to its QAPP and U.S. EPA Method TO-15. Each charcoal tube will be analyzed consistent with OSHA Method 1001. For the analytical testing, TO-15 SIM will be used for the residential and commercial indoor air samples to obtain lower detection limits for chlorinated solvents. Severn Trent Laboratories (STL) and/or Accutest Laboratories will conduct the analytical work for the site. Baseline indoor air samples from properties will be analyzed with rush turn around times (24-48 hours) requested; baseline subsurface slab samples and sampling subsequent to installation of treatment systems will be analyzed with standard turn around times requested.

4.4.4 SUBSURFACE SLAB SAMPLING

Subsurface Slab sample ports will be installed and sampled in accordance with the Response Engineering and Analytical Contract (REAC) SOP #2082. A copy of the SOP is included in Attachment H. Note that a vacuum equipped with a HEPA filter may be used during installation activities to minimize impact to the occupants.

Sample Collection

Subsurface Slab samples will be collected using 6-liter Summa™ canisters fitted with a flow orifice pre-calibrated to collect a 6-liter sample over a twenty-four hour period. Once the 24hour sampling period is completed, the Summa™ canisters will be boxed and shipped to the laboratory for analyses of TO-15 SIM analytes. A brief outline of the sampling protocol is provided below.

At the start of the sampling event, a pressure gauge reading will be performed. Values will be recorded. Flow rates will be less than 200 mL/min and sampling will continue until a complete 24-hour sample has been collected. At the end of the sampling event, a pressure gauge reading will be performed. Values will be recorded. If the final volume of sample is greater than 4-liters, and the canister is still under vacuum (>2 in. Hg), the sample will be considered valid.

The 6-liter Summa™ canister with a calibrated 24-hour orifice will be connected to the stainless steel vapor probe using Teflon™ tubing. Note that collection with a calibrated orifice will ensure that the flow rate is not greater than 200 mL/min, which is the flow threshold above which VOC stripping from soil might occur (CalEPA 2003). After the sample is collected, the safety cap will be installed.

Data concerning sample collection will be documented in a field notebook and the samples will be handled as documented under the QAPP.

4.4.5 INDOOR AIR SAMPLING

A physical survey of the buildings to be sampled will be conducted, in conjunction with an interview of the occupants of the buildings. The purpose of the physical survey is to obtain data that will allow a qualitative assessment of factors that potentially could influence indoor air quality. The physical survey includes collecting information on aspects of the building configuration such as building layout, attached garages, utility entrances into the building, ventilation system design, foundation conditions, presence of foundation sump, building material types (e.g. recent carpeting/linoleum and/or painting), presence of fireplace, location of laundry facilities, etc. The physical survey also includes collecting data related to indoor air quality such as use of cleaning products, dry-cleaner use, carpet cleaning services, indoor storage of paints and/or petroleum hydrocarbon products, use of aerosol consumer products, smoking, hobby crafts, etc. During the physical survey, the basement will be pre-screened with a PPB-RAE to determine if any chemicals may be present in the sampling area.

Occupants will be requested to keep out of the sampling area during the sampling event, if possible. Occupants will also be requested to close heating ventilation and air conditioning (HVAC) vents in the area during the sampling event, if possible.

Indoor air sampling methods include Summa canister sampling, as outlined by the U.S. EPA; and Method 1001 industrial hygiene sampling, as outlined by OSHA. Both methods have been shown to be reliable methods for obtaining valid indoor air results in industrial settings. A copy of the sampling information sheet on TCE sampling produced by OSHA is included in Attachment I.

4.4.5.1 INDOOR AIR SAMPLING – SUMMA™ CANISTER

The residential and commercial indoor air samples, and some industrial indoor air samples will be collected using a Summa™ canister (6-liter capacity) equipped with a critical orifice flow regulation device sized to allow the collection of an air sample over a 24-hour sampling period. Samples will be collected from the lowest inhabitable level of the building in order to determine the potential for vapors to enter the breathing zone of the occupants. Care will be taken to deploy the Summa™ canisters away from the direct influence of any forced air emanating from air conditioning units, central air conditioning vents, furnaces or heaters.

The indoor air sampling procedure is described as follows:

- Building spaces will be examined to determine a location for deployment of the Summa™ sample canister as close as practical to the center of the space. The location will be representative of the breathing zone or approximately one to two meters above the floor level. An attempt will be made deploy the canister in areas that are not subject to disturbances or locations that interfere with the occupant's normal activities.
- Air sample canisters will be labeled with a unique sample designation number. Both the sample number and the sample location information will be recorded on the Indoor Air Sampling Field Form (Attachment J).
- The Summa™ canister vacuum will be measured using an integrated vacuum gauge immediately prior to canister deployment, and recorded on the Indoor Air Sampling Field

Data Sheet. The critical orifice flow controller will be installed, as supplied by the laboratory, on the canister and the canister will be opened fully at the beginning of sample collection period and start time recorded on the Indoor Air Sampling Field Data Sheet.

- Other data recorded on the Indoor Air Sampling Field Data Sheet will include: outside and
  interior temperatures both at the start and end of the sample period, basement depth, equipment serial numbers, sampler name, and any comments. Photographic documentation of the sampling event will be conducted, including the address of the sampling event, if permitted by the property owner, and summarized on the Occupant Information Form.
- The canister valve will be closed fully at the end of the sample period (after 24 hours) and the end time recorded on the field data sheet. If there is evidence of canister disturbance during the sample collection, this will be recorded on the Indoor Air Sampling Field Data Sheet.
- The Summa™ canister vacuum will be measured immediately after canister retrieval at the end of the sample period and recorded on the field data sheet. Samples will be rejected (ie. not analyzed) if the canister has been observed to have reached atmospheric pressure. Once the vacuum is measured, the safety cap will be securely tightened on the inlet of the Summa™ canister. Field data will be verified as correctly entered into field books prior to shipment and canisters will be shipped to the laboratory under a chain of custody.

4.4.5.2 INDUSTRIAL INDOOR AIR SAMPLING – CHARCOAL TUBE

Some industrial indoor air samples will be collected using charcoal tubes and personal sampling pumps. The sampling procedure for charcoal tubes is presented below.

4.4.5.2.1 APPARATUS

Samples are collected with 7-cm × 4-mm i.d. × 6-mm o.d. glass sampling tubes packed with two sections of coconut shell charcoal. The tubes contain 100 mg of adsorbent in the front section and 50 mg in the back section. The adsorbent sections are held in place with glass wool plugs and are separated by urethane foam plugs. The ends of the glass sampling tubes are heat sealed. Samples are collected using personal sampling pumps that have been calibrated, with sampling devices attached, to within ±5% at the recommended flow rate of 50 mL/min. The charcoal tubes are connected to the pumps with flexible, non-crimpable tubing.

4.4.5.2.2 METHODOLOGY

Immediately before sampling, break off the ends of the charcoal tube. Connect the sampling tube to the sampling pump with flexible, non-crimpable tubing. Position the tube so that sampled air first passes through the larger adsorbent section. Air being sampled should not pass through any hose or tubing before entering the sampling tube. To avoid channeling, place the sampling tube vertically in the breathing zone. After sampling for 240 minutes, immediately remove the sampling tube and seal it with plastic caps. Submit at least one blank sampling tube with each sample set. Blanks should be handled in the same manner as samples, except no air is drawn through them. Earth Tech will record air volume (in liters), sampling time (minutes) and sampling rate (mL/min) for each sample. Also, list any compounds that could be considered potential interferences, especially solvents, which are being used in the sampling area.

4.5 PROGRESS UPDATES

A written weekly update will be distributed to document the progress of the Phase II Work Plan. The following representatives will be included on the distribution:

- Chrysler Project Staff
- EPA OSC
- EPA START
- Earth Tech
- Ohio EPA
- Ohio Department of Health
- Montgomery County Health Department

For the weekly update, Chrysler will distribute the latest project status which will include:

1) Latest Validated Sample Results
2) SSDS Installation Status and Installation times/date
3) Summary sheet for each residence or school not in compliance with the ATSDR/ODH indoor air screening level including results, vacuum readings and plans for upgrading system
4) Plans for the next week

5) Project Issues

Monthly conference calls will be conducted with representatives noted above. The monthly conference call will be arranged by Chrysler and the agenda will cover the same topics as the weekly project status submittals.

5. SYSTEM INSTALLATION

In the event that validated test results from indoor air sampling of properties sampled under Task 3 are higher than the applicable TCE Indoor Air Screening Level for the type of property sampled, i.e. residential or school, commercial/community, or industrial, a SSDS will be installed in those properties, if access is granted by the property owner.

Access agreements should be retained for each property. A sample Property Access and Activity Agreement is included in Attachment K.

The objective of the depressurization systems is to reduce exposure of the building occupants to elevated indoor air concentrations of TCE within the properties. Chrysler will work closely with the contractors responsible for the installation of the systems to ensure proper installation and operation of the systems. A description of the technology and installation procedures is outlined in the following sections.

5.1 SYSTEM CHARACTERISTICS

Sub-slab depressurization technology consists of the creation of a suction point located in the basement connected to a high static suction fan. The suction fan will be mounted outdoors and will be mounted directly on the system piping and fastened to a supporting structure by means of mounting brackets. On average, the suction fan will provide coverage of 2,000 square feet per slab penetration. This coverage may vary depending upon the sub-slab material. In general, the tighter the material, the smaller the area covered per slab penetration. The suction fan will operate continuously to vent the subsurface beneath the basement slab.

5.2 SYSTEM INSTALLATION

Installation of the sub-slab depressurization system will be conducted by Air Quality Control Agency and/or The Environmental Doctor Company (Radon Company License No. RC98). The companies are knowledgeable contractors with experience in installing similar systems in the Dayton, Ohio area. The contractor shall follow the methods outlined in *ASTM Standard E 2121-03 – Standard Practice for Installing Radon Mitigation Systems in Existing Low-Rise Residential Buildings* and comply with local codes. Prior to installing the mitigation system, Chrysler and the contractor will consult with the occupant and evaluate the property to determine the most effective and convenient location. Local building codes shall be followed during installation of the system.

Installation will begin with the creation or determination of a sub-slab suction point within the basement of each property. A portion of the basement slab will be cored and/or saw-cut using a concrete coring tool, saw or other appropriate tool, and the concrete removed. A small excavated hole will be created in the sub-slab material where the end of the suction point pipe will be placed. The size of the excavated hole will vary depending on the permeability of the sub-slab material. 3-inch diameter Schedule 40 polyvinyl chloride (PVC) piping will be routed from the suction point, through the slab and outside the basement through a wall penetration. The pipe will then be connected to a suction fan and the exhaust piping will be routed to the roof-line, taking care to exhaust the air above any nearby intake pipes or building windows.

Any openings around the suction point penetration, utility penetrations, and other openings in the slab will be appropriately sealed. The power supply for the fan will be locked to prevent accidental shut-off of the system. Residents will be supplied with a key to allow for the power to be turned off for maintenance purposes. A typical sub-slab depressurization system is illustrated in Figure 5. A permanent vacuum gauge will be installed on each system on the suction side of the fan. Following startup of the system, an initial vacuum reading will be recorded.

5.3 OPERATION AND MAINTENANCE MANUAL

Within 60 days of installation, an operation and maintenance manual will be supplied to each property owner. In addition, keys to the power supply for the fan will also be supplied to each property. Contents of the operation and maintenance manual will include, but not be limited to, the following information:

- Operator’s manual for the system
- Contact information sheet
- System life expectancy
- Pre and post installation sampling results
- Photographic documentation (if available)
- Copy of the Access Agreement (if available)
- Link to the U.S. EPA website

- Warranty information
- Tabs for future sample results (180-day, annual, etc)

6. POST SYSTEM INSTALLATION MONITORING

Post system installation monitoring will be conducted to ensure proper operation of the sub-slab depressurization systems. Monitoring will be conducted in accordance with the sampling procedures outlined in Section 4.0: Sampling Plan.

Following system installation activities, indoor air and sub-slab air sampling will be conducted at the properties on the following timeline:

- The first sample will be taken within 30 days of the initial post system installation sample
- The second sample will be taken within 180 days of the initial post system installation sample
- The third sample will be taken within 1 year of the initial post system installation sample
- Sampling will be scheduled and completed annually following the first year

The TCE SSDS operation will continue until it is determined by the EPA OSC that the system can be shut down. Following termination of the system operation, sampling events will be conducted on a quarterly basis. Work under Phase II will not be complete at any structure until quarterly monitoring (4 continuous quarters) for sub-slab and indoor air is documented less than the applicable screening levels, following the termination of the TCE vapor abatement system operation.

In the event the system has not reduced concentrations below the applicable screening level within 30 days of system installation, another sample will be collected within 60 days of system installation. In the event the system has not reduced concentrations below the applicable screening levels within 60 days of system installation, the SSDS will be upgraded within 30 days (90 total days after installation). Using engineering best practices, appropriate upgrade requirements will be determined based on radius of influence testing. Upgrades can include additional extraction points, sealing cracks in floors of the basement, and/or sealing or fixing drains. Following upgrade, a post-upgrade sample will be collected within 30 days of the upgrade activities.

In the event the upgraded system has not reduced concentrations below the applicable screening level based on the initial 30-day post upgrade sample, the SSDS will be upgraded again within 30 days. Using engineering best practices, appropriate additional upgrade requirements will be determined. The same upgrade process will continue as written above until the upgraded system reduces TCE concentrations below the applicable screening level.

In the event that access is denied for post system installation monitoring, or upgrade activities, Chrysler will notify the U.S. EPA and MCHD that follow up sampling cannot be completed due to access denial.

Copies of the monitoring data will be submitted to the U.S. EPA and MCHD. In addition, results will be forwarded to each property for inclusion in their Operation and Maintenance Manual.

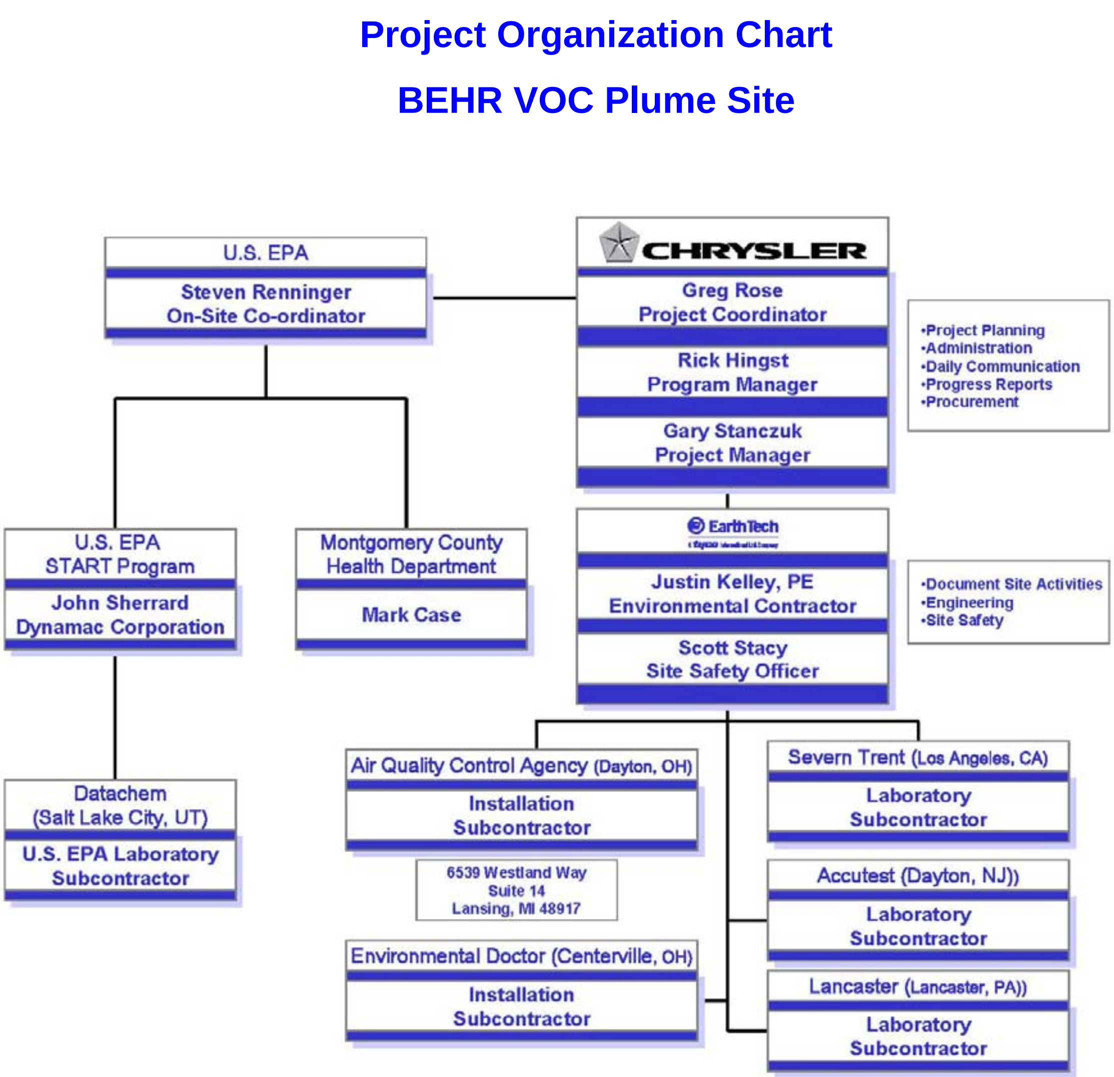
During each sampling event, an inspection of the system will be conducted. System inspection activities will include:

- System vacuum/pressure readings
- Confirm operation of the blower fan
- Visual inspection of system piping and components
- Inspect floor and wall seals
- Confirm operation with occupants

7. PROJECT MANAGEMENT

7.1 RESPONSIBILITIES AND FUNCTIONS

The work outlined in this work plan will be managed as per the following project organization chart.



Contact numbers for each member are given in Table 1.

Table 1 – Contact List

Contact Name	Phone #
Steven Renninger (U.S. EPA)	(513) 569-7539
John Sherrard (Dynamac)	(513) 703-3092
Mark Case (Montgomery County Health Department)	(937) 225-4429
Greg Rose (Chrysler)	(248) 576-7362
Rick Hingst (Chrysler)	(248) 576-7371
Gary Stanczuk (Chrysler)	(248) 576-7365
Justin Kelley (Earth Tech)	(734) 779-0364
Scott Stacy (Earth Tech)	(734) 779-2819
Jamey Gelina (Air Quality Control Agency)	(800) 420-3881
Brenden Gitzinger (Environmental Doctor Company)	(937) 433-5202

7.2 PROJECT SCHEDULE

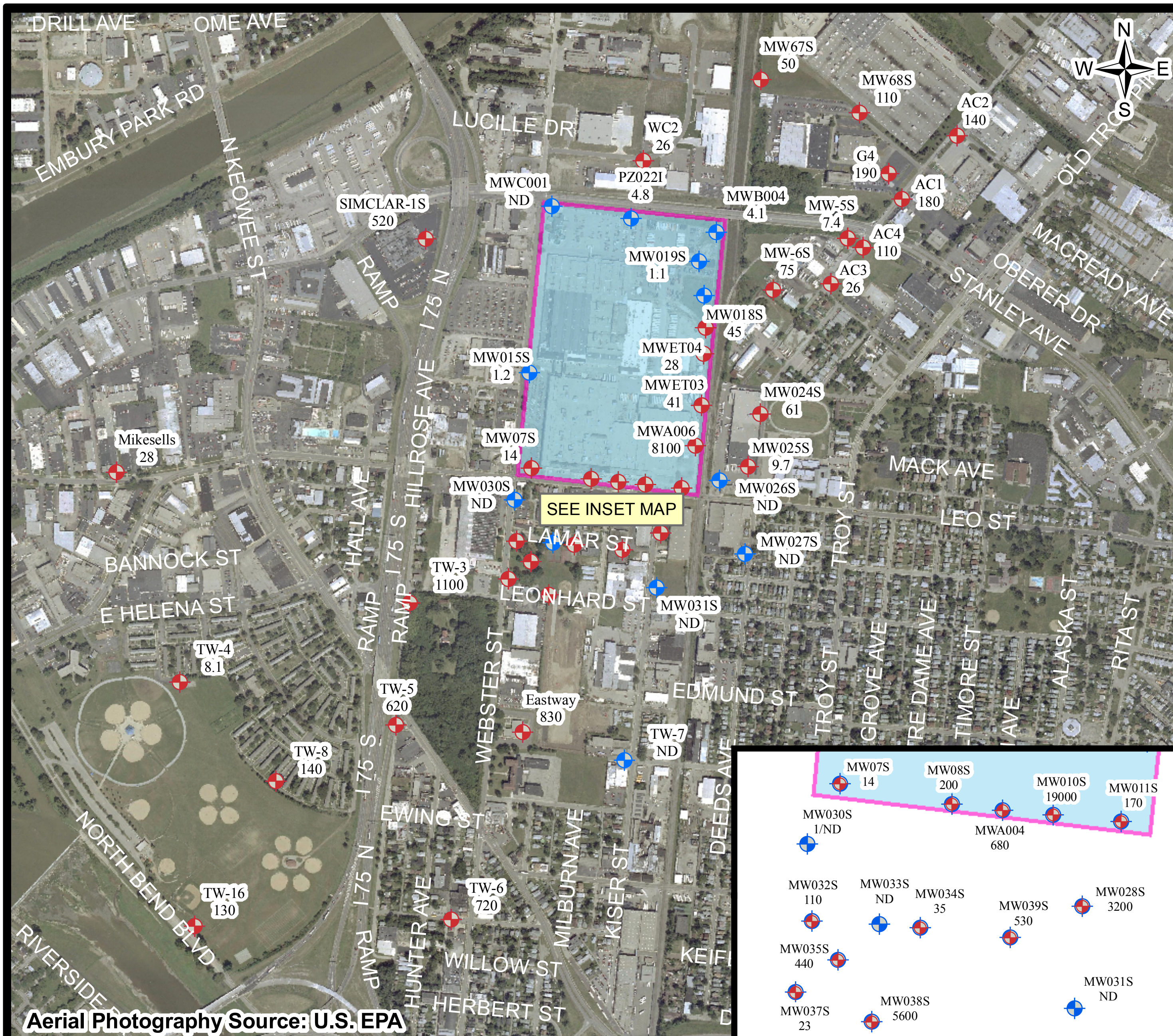
The actual sampling and mitigation schedule of activities will be dependent upon the timeframe in which permission to access the structure is obtained from the property owners, and the results of sample analysis are received from the laboratory; however, the following schedule is planned:

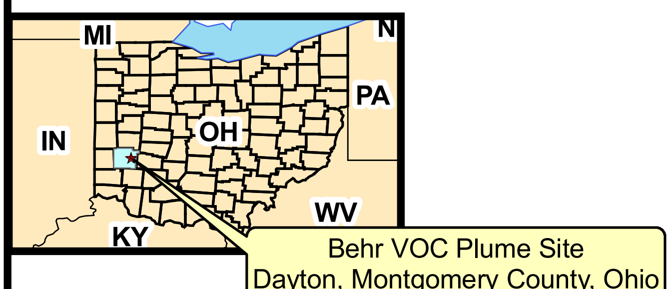
- Initiation of steps to obtain access agreements for sampling within 14 days of receiving from the U.S. EPA written approval of the Phase II Work Plan.
- Initiation of quarterly sampling activities within 90 days of receiving sample data meeting criteria for quarterly monitoring.
- Initiation of mitigation activities within 30 days of receiving sample data meeting criteria for a SSDS installation, as stated in Section 5.
- Within 60 days of SSDS installation, submit an Operation and Maintenance manual to the property owner and tenant(s), if necessary.

The U.S. EPA will be updated on the actual schedule of activities related to implementation of this Work Plan during the progress meetings.

The flow chart summarizing the timetable has been included in Attachment L.

Figures





2007 TCE Above 5 ug/L

2007 TCE Below 5 ug/L

Figure 1

U.S. EPA REGION V

2007 OHIO EPA SHALLOW
GROUNDWATER SUMMARY MAP
BEHR VOC PLUME SITE
DAYTON, MONTGOMERY COUNTY, OHIO
NOVEMBER 6, 2007

Scale: 0 500 1,000 Feet